

COMPUTERWORLD

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Trend to Mixed-Vendor Use Part of Success Story

By Phyllis Huggins
CW West Coast Bureau

LOS ANGELES — How to save your management \$50,000 - \$100,000 a year in equipment rentals by using mixed-vendor systems is the story that Pacific Mutual Life Insurance Co. (PMLI) has to tell.

The trend to mixed vendors is one of the most dynamic developments in the IBM-tied DP industry, and Pacific Mutual is not the average IBM installation. PMLI is famous on the West Coast because until recently it successfully ran a high-volume shop using a Univac I and

two Univac IIs doing its own maintenance.

PMLI was never an IBM captive installation because it had in-house hardware skills to help evaluate equipment.

Spotlight on User's Lib

When the vintage machines were retired in 1969, an IBM 360/65 was brought in. PMLI not only had the conversion problem to cope with but as it operates 24 hours,

seven days a week, it couldn't risk poor performance or sloppy maintenance.

The solution: a computer center that is home to six vendors with whom they express full satisfaction. Total cost savings haven't been realized since the company is waiting for more peripherals that haven't been delivered.

The motive for going this route was not budget cuts but a desire for best performance for the dollar.

PMLI's 360/65 with 512K core is on third party lease but savings brought about by this step are not figured

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CAI Travels On

Elementary school teachers in Pennsylvania are learning to recognize characteristics of handicapped children with a computer-aided instruction system in a van that comes directly to a school in their area. The system gives teachers enough information to refer children to the proper doctor. The IBM 1500 system includes synchronized audio equipment so that teachers can hear examples of garbled speech relating to particular handicaps.

4 Leasing Firms to Provide Maintenance Source Choice

By Edward J. Bride
CW Staff Writer

NEW YORK — The standard leasing contract requirement of "maintenance by manufacturer" was eliminated by four major leasing companies last week, liberating some 500 users from single-source maintenance.

Under the new agreement, customers who lease "mixed systems" can also obtain all their maintenance services from one source.

Data Processing Financial and General (DPF), Diebold Computer Leasing, Randolph Computer, and Talcott Computer Leasing have agreed to permit an independent maintenance company, Comma Corp., to service their customers.

Comma "specializes" in IBM

equipment, but has expertise in other computers with the "capability to expand" to all manufacturers' equipment, said Board Chairman Richard K. Puder.

The company, which has been in business about a year, formerly provided maintenance for owned computers and plug-to-plug compatible peripherals.

Since IBM still considers maintenance as part of its leasing contract, users now have a real choice of where they get their maintenance, while retaining the advantages of leasing.

IBM said it was not considering separating maintenance charges from its leasing contracts, but declined speculation on whether the matter would be brought under consideration when actual

price differentials are available.

10% Below IBM Prices

Comma's maintenance costs have been approximately 10% below IBM's, Puder claimed. The company already has customers under the new agreement, he added.

Officials of all four leasing companies had praise for Comma, with DPF's Ryal Poppa claiming the event was of "major importance" to the leasing industry. Poppa is also president of the Computer Lessors Association.

He said third-party maintenance could lead to "more responsive" services at a cost saving for leasing customers, and suggested Comma "can best do the job" for DPF and its customers.

Cornelius T. Ryan of Randolph noted cost savings and technical advantages of the independent company, and John J. Graham of Diebold said he had high regard for Comma's service and standards.

Truman Rice of Talcott noted Comma's 10 current locations, plus planned service centers, would provide "the optimum" in maintenance services for lessees.

Comma provides maintenance service to computer systems owners and users, and supports computer equipment manufacturers and leasing companies with a complete range of main-

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39.5% Pass DPMA Programmer Test

By Edward J. Bride
CW Staff Writer

PARK RIDGE, Ill. — The results are in, and 39.5% of the candidates passed the first annual Registered Business Programmer Examination last October.

Over 1,100 candidates took the test at various locations in the U.S. and Canada, and the Data Processing Management Association (DPMA) reported that 434 candidates were successful.

Although it did not disclose the minimum cutoff point, DPMA said the highest grade was 88, with 126 of the 143 questions answered correctly. Seven questions were eliminated after a post-test evaluation by the DPMA Certification Council.

'Editing Problems'

The association's preliminary review of the examination ad-

mitted "editing problems" with the test, but said the problems "did not impair the reliability or relevance" of the test "as a measure of business programmer knowledge." In fact, the council said the test met the objectives

"in greater measure than anticipated."

Responding to criticism of the appropriateness of certain questions, the report said a group of "programmers and experts" had considerable agreement on the

higher ranking tasks, but considerable disagreement regarding the importance of lower ranking tasks.

"Therefore, the decision was made to include questions in the

(Continued on Page 2)

College Survey

DP Appeals to Class of 1970

RAHWAY, N.J. — One hundred and twenty-five thousand of last year's college graduates "definitely would like" data processing as a career, according to a recent study by Placement Research here.

In a recently released study at four universities, more than half of the 2,600 students termed EDP acceptable, and one-eighth said they definitely would like it. Placement Research says that the data is representative of all of the estimated 1 million 1970 college graduates — thus the 125,000 figure.

The study was based on career interest self-evaluations of seniors and graduate students in the class of '70 on four major campuses: Maryland, Michigan State, Rhode Island and Rutgers universities. Completed with the cooperation of placement officers at the respective institutions, the evaluations were used by Placement Research in a

computerized recruitment prescreening service that matches students' career interests with specific job opportunities.

Each student was asked to rank his preferences for various types of work by degree of interest. For EDP as a job activity, the overall response from some 1,950 men and 665 women was:

Acceptable 25%; would consider favorably, 17.8%, and definitely would like, 12.7%. On the negative side, 26.5% were unlikely to consider, and 18% "definitely would not like."

Among men, the respective percentages were: 28.3, 20.4, 14.3, 24.8 and 12.1. Among women, they were 15.3, 10.3, 7.8, 31.5 and 35.1.

The study also looked at student preferences on the basis of areas of study.

"As might be expected," Alan M. Levine, head of

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Guard Your Home With a Mini

NEW YORK — Burglars might be advised to put minis on their list of "arch enemies."

Holmes Protection Inc. has ordered 12 Varian 620/Fs for installation at six central stations to comprise a protective computer network.

The system will provide continuous monitoring of burglar alarms installed at more than 1,000 bank branches and 14,000 homes, jeweler, furrier, and retail stores.

Part of the system includes special codes which the com-

puter recognizes and acts upon. A triggered burglar alarm alerts the computer, which then waits a predetermined time, usually 30 seconds, to see whether the alarm is canceled.

If the cancellation code does not come in, the computer activates both audio and visual alarms at the central station.

Tip Off Possible

An observer then intervenes and alerts a special dispatcher who in turn sends guards or policemen to the scene.

A customer under duress who

has been ordered to send in a cancellation of the burglar alarm, can tip off the computer to the situation by using the wrong code number. Code numbers that come in are automatically checked and verified.

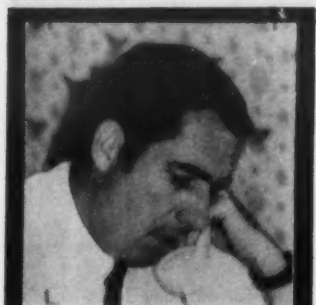
If there is a discrepancy, the alarm signals are activated and help is sent to the scene.

The network will also monitor fire alarm signals and alarms detecting water seepage in basements, cold storage temperatures, and air conditioning malfunctions.



Pick a Celica

Prospective owners of Toyota Celica autos select the model and options desired with the aid of the "Car-puter." IBM 2760 Optical Image units, paired with 2740 printers using the Katakana alphabet, are linked to a 360/50 at Toyota's sales headquarters. The 360/50 is on-line with the company's manufacturing plants. Delivery time is reduced by transmitting orders to the factory via the 2760s.



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Montana's Legislators Have Easy Access to Law

CW Midwest Bureau

HELENA, Mont. — Montana has programmed the state's Constitution, the national Constitution, and all the state laws into a retrieval system for use by the Montana State Legislature.

Designed by Data Retrieval Corp. of Milwaukee and named Statutory Information Retrieval System (Sirs), the system will print out information on the laws of the state or country after a given interrogation by category.

Included in the system is a concordance, which the designers described as a dictionary of the words in the state laws and constitutions and the sections of the laws in which they appear.

Troy M. McGee, director of the state's IBM-equipped central data processing division, explained that the test demonstration of the system was a query requesting a printout of all sections of state law concerned with aircraft.

The search took less than five minutes, McGee said, and gave a printout of the 163 references to "aircraft" in the state laws.

The system was designed to provide the information to the state legislature. The upcoming sessions of the legislature will have an opportunity to employ the system soon.

The Montana Constitution has been amended to change the minimum voting age to 19. All laws mentioning the minimum voting age of 21 will have to be searched for the change. An offi-

cial said a search like that could consume months in the manual search methods employed prior to Sirs.

Sirs cost the state \$62,500, and can be updated after each legislative session for a cost of \$7,500, McGee said.

39.5% Pass DPMA's Programmer Test

(Continued from Page 1)

examination on every task receiving votes" by evaluators in banking, retailing, and utility installations.

The report noted that every question was read and evaluated by "several persons judged to have extensive knowledge in programming" and that the test stood as an "adequate measure of business programmer knowledge in its present form."

DPMA said the test proved the value of experience, as "less than a dozen candidates" with less than two years' experience passed. This fact, plus the top grade of 88%, led the certification council to conclude that the test "meets moderately rigorous statistical standards."

Aside from the seven questions eliminated from the test, there were 18 with typographical errors which "did not appear" to affect the validity of the questions, the report contended.

A five-member subcommittee has been established by the council to act as advisors for all subsequent Registered Business Programmer Examinations.

Over Half of Students Surveyed 'Definitely Would Like' DP Career

(Continued from Page 1)

Placement Research, reported, "computer science majors showed the strongest preferences: 94.1% of the seniors and every graduate student expressing themselves as 'definitely would like.'"

"While there was no computer science senior in the 'definitely would not like' group, 2.9% did say they were unlikely to consider. And computer science students also showed a very strong interest (88%) in finance and insurance."

Physical science-math and engineering students were also strongly inclined toward EDP, with 37.1% checking "definitely would like," 28% "consider

favorably" and 23.1% "acceptable."

Fine arts majors, on the other hand, were among the least inclined toward EDP. Among seniors, 40% said they "definitely would not like" it, and 39% said they were "unlikely to consider" the field.

By comparison, the same total group of students opted for manufacturing as a job activity with a 59% favorable vote, 86% tended to like business as a career, 55% expressed a positive interest in selling and 68% could see themselves in marketing, advertising and public relations.

Placement Research's job matching service is available on 34 campuses this year.

All members are holders of the Certificate in Data Processing who passed the programming section of the 1970 CDP test in the upper 5%. The report also said "active participation in business programming is an important additional qualification" of the subcommittee members.

Update Test

The subcommittee group will review and update the test each year, recommend programming areas to be tested, edit new questions, update study guides, and review test results.

The test will be given again in October.

Successful candidates received their notification and a "membership card" Jan. 16, according to a West Coast consultant who passed. The names are kept on file at DPMA headquarters here, so potential employers can check on a programmer's achievement.

Although the test will be given annually, only one successful attempt is needed in order to be a registered business programmer, as is the case with the CDP.

DP Hassle Taxes Colorado

DENVER — A proposal to level off computer spending by establishing service centers for state agencies and institutions is being evaluated by Colorado officials.

Commissioner of Administration Bernard Teets made the proposal in light of legislative concern over an increasing DP budget and increasing requests for computers.

Teets has policy-making authority for computers, but funds are appropriated directly to user agencies. Therefore, Teets complained to the legislature recently that he has no real authority to establish these centers.

The administrator said the state colleges generally oppose the concept of service centers, fearing insufficient support and services, as well as a loss of funds.

"It's just not economical for everyone to have his own box," Teets related. He noted there is a question of "how much the state can do to support" the continuing proliferation of computers and concomitant budgetary increases.

Colorado's DP budget for fiscal year 1969 was \$8.3 million. This year its bill is expected to run \$14.3 million, and the proposal for 1972 is for \$17.3 million or, as a local newspaper pointed

out, more than \$8 for every man, woman, and child in the state.

Teets said that service centers, or one or two large computers with remote capabilities for instructional use, would be more efficient. He said users are "evaluating their needs" and he hopes to have additional recommendations for the legislature in early March.

Users Choose Service Source

(Continued from Page 1)

tenance services.

The four companies also agreed to use Comma for the full range of other computer maintenance services, including reconfiguration and reconditioning (R&R).

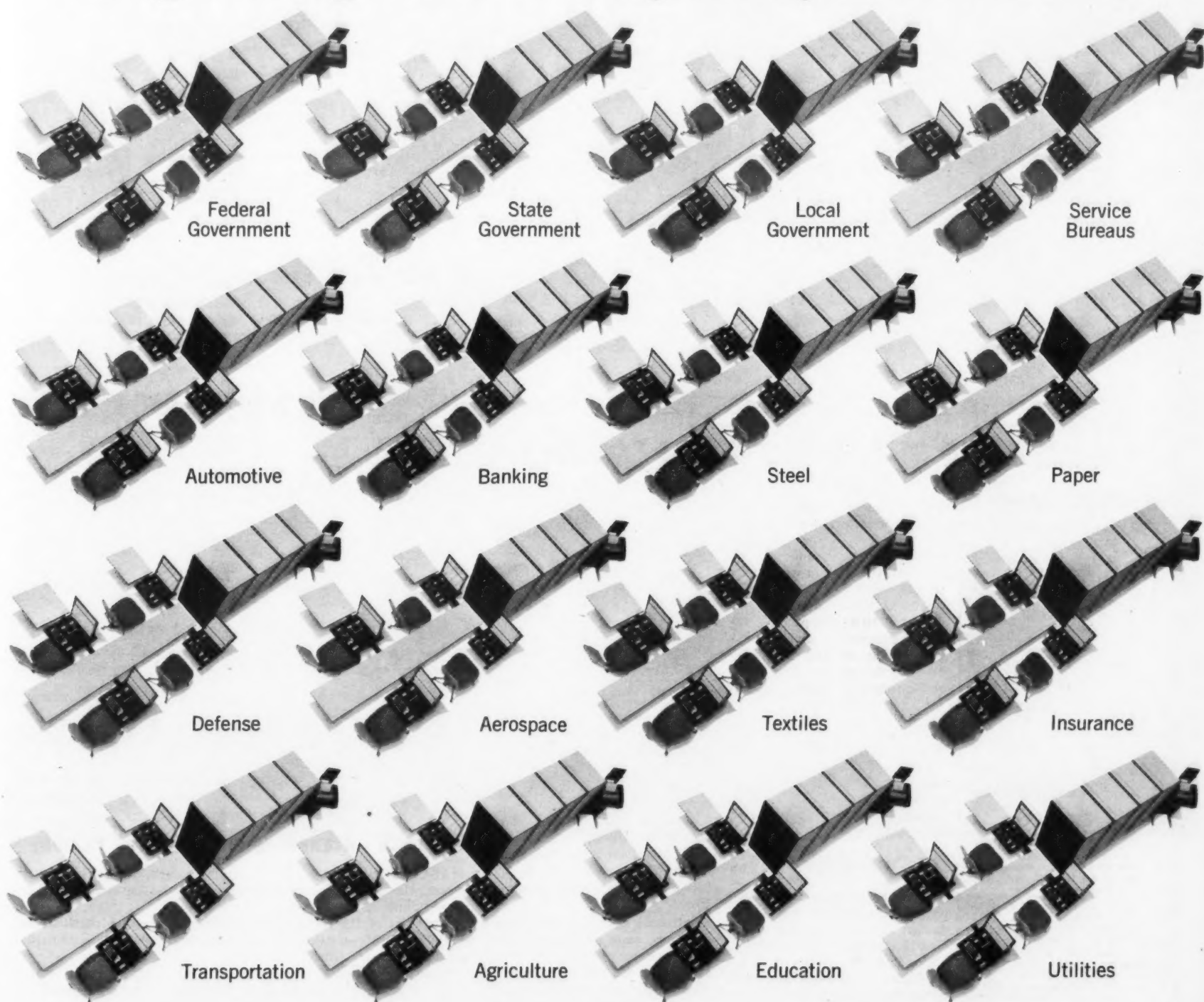
Other terms were not disclosed. The agreement was described as "long term."

Puder predicted other leasing companies would turn to independent, third-party maintenance firms, which will "soon be serving a healthy segment" of the computer lessees.

Poppa agreed, calling the arrangement a "milestone in the development of the computer leasing industry." He said the "problem of computer maintenance" had been "under study for some time."

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N.Y. OTB Not Off to Races Yet

NEW YORK — Offtrack betting on the ponies will remain illegal in this city for at least a little while longer because of a threatened labor walkout at Yonkers, a disagreement over who will pay \$1 million for the installation of an interface at Aqueduct, and purported "kinks" in the computer system.

Legal, computerized offtrack betting was supposed to begin here Jan. 11, and apparently the computer itself and the terminals in the betting shops were ready to go, but getting OTB's DP equipment into the race-tracks was another problem.

Under the New York City Off-Track Betting (OTB) plan, money bet on New York races would be included in the pari-mutuel pool at the track whether it was bet at the track or through OTB, which requires terminals at the track to register the OTB bets.

Two different procedures are to be used.

At Yonkers Raceway, wagers would be received from OTB by teletypewriter and input into the pari-mutuel system by hand.

At Aqueduct, however, the OTB's IBM computer would interface directly to the Aqueduct Honeywell computer.

But OTB has never come to an agreement with the tracks as to how these installations would be made. Neither OTB nor the New York Racing Association is willing to pay the \$1 million cost of that interface at Aqueduct, for example.

At Yonkers, the pari-mutuel clerks have threatened to strike unless their union represents the OTB clerks. But the OTB clerks voted for a different union.

The problem is money — Yonkers clerks get up to \$58 a night, whereas OTB clerks will only get \$3/hr — and the Yonkers clerks are afraid of losing their jobs to lower-paid OTB clerks if the OTB plan cuts track attendance.

When OTB President Howard Samuels first announced the delay in the opening of the system, he placed the blame partly on "kinks in the computer."

But OTB officials now deny there were any such kinks, and claim only that Samuels wanted more testing to make sure that the system did not have the opening difficulties that accompany most new computer systems.

The system is being developed by Computer Sciences Corp., based on the Computicket system. One company spokesman called it a "panic program" with the entire job being done in only nine months.

But OTB spokesmen say that the system will be up and running within two weeks of the installation of a computer terminal at Yonkers.

When the system opens, there will be only five betting shops, but 10 shops per month are planned to be added.

One of the initial shops will be in what used to be railroad ticket windows at Grand Central Station. Gamblers who make a deposit in advance will be able to place bets by telephone.

The system has already cost New York over \$15 million, but proponents hope that the system will produce \$25 million in tax revenue for the city the first year, and eventually up to \$200 million/yr. Bets are taxed at 17.2%.

The system will use dual 360/50s for the central processor and PDP-8s as data concentrators.

PMLI Home to 6 Vendors

(Continued from Page 1)

into the mixed vendor savings. By using third-party lease the company saved enough to bring in 256K more core at no increase in budget.

On a straight lease are an IBM card reader, two tape control units, a printer control unit and printer.

Eight IBM tape drives will be replaced shortly with Telex drives and eight Telex drives are now in operation. PMLI believes that plug-in compatibility is not enough and that the units have to be media interchangeable.

A Century Data CD-14 control unit with five spindles, compatible to the IBM 2314, is in use and a second one will replace seven MAI 2301s. Three Sanders Communications terminals are used as the front end.

The data conversion job is handled by NCR-marketed Mohawk Data Corp., key-to-tape devices and the keypunch operation predominantly Univac.

Kenneth T. Garrison, vice-president of systems and data processing says: "Some of these decisions we approached tenderly with a great deal of concern. What we thought was bold is now matter of fact. As we look back we see the strategy that evolved — we are now a computer center of many suppliers and IBM is one of them."

Walter Matos, manager of the DP department, adds: "Vendors love to see others besides themselves in the shop. They don't pass the buck. And I personally would rather deal with maintenance men from four or five companies instead of just one."

Both men agree that IBM has never been unreasonable. "We think they've been fair." PMLI's method of working with IBM was to discuss with them openly all changes they were planning.

Garrison points out that a mixed vendor operation is not unique in that every communica-

tions user is dealing mixed vendor now since he has the telephone company and transmission equipment involved in his center.

Savings came to Pacific Mutual in more than price/performance costs. As IBM charges 10% for every shift over prime shift and PMLI operates two extra shifts, 20% was saved on every piece of non-IBM equipment, since the peripherals companies don't charge this way.

The recent elimination of overtime charges by IBM for disk drives reduces some of this saving.

There is a contract difference, however. Peripherals companies require a one-year lease while IBM has a 30-day cancellation clause. Garrison notes that some companies are now using 30-day leases to become more competitive.

Both men note that fluctuating demands, such as found in the aerospace industry, where units are added for peak loads and then canceled at down periods, make the one-year lease a costly restriction.

While the company uses the federal Government's guidelines for plug-in compatibles, it strongly recommends talking to other users. "Data center heads talk to each other and help each other out. Ask the man who has one," they add.

With all the excitement about mixed vendor use there is one user left out in the cold — the user not located in one of the main geographic centers. Industry predictions are that it will be three years before peripherals companies can afford to support maintenance men in other than concentrated areas.

In addition, there is the in-plant problem of a data center head who recommends mixed-vendor equipment but is stopped at management level because of IBMitis.

News Wrapup

Murder Victim Linked to DP

DAYTON, Ohio — A 24-year-old man, shot to death while on an errand for his boss, was to have become the vice-president of a small computer repair firm.

As yet, no suspects or arrests have been reported in the case.

The sheriff in charge said that the body of John L. Calkins had been shot several times through the back of the head with a large calibre pistol.

Calkins was reported to have been discharged from the Air Force last summer and had planned on going into business with another man to operate the D & Z Co.

Robbery has been ruled out because the victim's possessions were still on his body.

Union Opposes Recording of Ethnic Origins

LONDON — A Civil Service Union, representing 65,000 persons, is blocking an attempt by a government department to record the ethnic origins of workers on a computer.

The Inland Revenue Staff Association has told the Civil Service Department that it does not feel there is any need to differentiate between members by ethnic origins.

The association has not objected to the computer recording age, sex or educational qualifications of Revenue workers.

Computer May Check Recall Signatures

JERSEY CITY, N.J. — An official faced with the task of verifying 150,000 signatures in 10 days is contemplating enlisting the aid of a computer service firm.

The signatures were collected by two separate petition drives seeking a recall election to remove from office Mayor Thomas J. Whelan and seven of the nine city councilmen.

City Clerk Thomas F.X. Smith has been advised by the election commissioner and the chairman of the Election Law Revision Commission that "there is nothing in the state laws that prohibit a computer." But even with a computer, Smith said he felt it would take longer than 10 days to go over the petitions.

Toll Tallying, Traffic Counting Go Modern

OWENSBORO, Ky. — The Audubon Parkway will be the first parkway in the state and one of the first in the country to use a new computer system to tally tolls and make traffic counts.

The system will enable personnel in the highway department's DP division to call the computer and learn in minutes a daily traffic count and a tally of tolls.

British Speed Up Economic Forecasting

LONDON — To speed up and simplify its economic forecasting techniques, the Treasury has installed an IBM 1130 linked to an IBM 360/65 computer at the IBM Bureau here.

It is hoped that the new installation will lead to a "more comprehensive and efficient exploitation" of the Treasury's mathematical models of the economy — "for the first time those concerned with policy will be able to take part themselves in the simulations or trial runs."

Calculations and simulations had previously been done by "conventional batch processing methods at computer bureaus" and the equations had to be taken both ways by messenger.

Commerce Acknowledges 'Missing' Persons

MANCHESTER, N.H. — For what it's worth, city officials were correct when they claimed sections of Manchester were missed by census counters.

An official of the Department of Commerce, which conducts the decennial count, said the "enumerator quit before he was finished," in one Manchester district.

The city's population count was increased by 411 as a result of the "miss," but an attempt to prove that Manchester's computerized count was more accurate than the Federal Government's human one failed [CW, Dec. 9, 1970].

The government official said such misses numbered "no more than about a half a dozen" across the country. He stated many municipalities had their projections fall short, as the result of a steep drop in the birth rate early last decade.

Poor Production Loses Job for Fair Carmella

GRUNTHAL, Manitoba — Poor Carmella! She seemed like the model worker, but in these tough economic times only the strong survive.

Or perhaps there was something about her sex life, some abnormal predilection for... But no, the company dismissed poor Carmella after she slaved three long years on the production line, and the reason given was a poor production record!

The management brought in a computer to analyze her work records and determine her production, her state of health and even delve into her mysterious sex life.

The computer predicted Carmella's performance as 17 index points lower than that of the four other coworkers!

And so, Carmella the Holstein dairy cow was laid off, the pounds of milk and percentage of butterfat melted away. It would be more profitable to sell her rather than feed her.

But weep no white tears for fair Carmella — even if she had a skeleton in her barnyard or even if her milk ran slow — she may have found her greener pastures.

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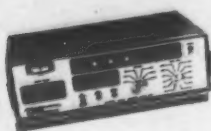
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COMPUTERWORLD

Truck Inventory Plan**Listen to 'Audre'**

By Thomas J. Morton

CW Midwest Bureau

FORT WAYNE, Ind. — The International Harvester Corp. (IHC), motor truck division, has initiated a truck inventory program here and incidentally found another use for the IBM 2721 terminal.

IHC's new system is an inventory system on trucks, using IBM 2721 battery-powered terminals, and is tied to IHC's sales offices.

An IHC sales district, or an individual IHC dealer, can interrogate the system housed in the divisional headquarters here and locate any given truck in seconds.

Using the 2721, which can accommodate any standard telephone, an IHC sales outlet requiring a specific model, color, and type truck with any combination of accessories, can dial the telephone number of the system — named "Audre" for audio response by IHC — and obtain the location of a truck meeting the required specifications in, IHC says, seconds.

Audio Response Unit

The system, in two partitions of a 360/65, takes and transmits through an IBM 7770 audio response unit. When a sales outlet makes a connect, the system asks for an identity which is done by a key on the 2721. Further security clearance is required by the sales outlet giving an assigned code number. Without the proper identification, the system disconnects, IHC says.

The interrogator punches keys on the 2721 for input, and voice is output, with a vocabulary of 128 words built into the system.

The sales outlet can then find the particular type of truck by numerics. When located, the sales outlet, IHC or independent dealer, can place a "hold" on that truck so the system will not release it on a later call.

IBM, in announcing the 2721 last January, saw the terminal as a portable unit with applications for inplant connection or out-of-property connections such as could be used by a field sales force.

IHC saw the 2721 as a "part-time" real-time terminal. IHC could not see the need of a terminal on a full-time connect or lease for its sales outlets when the terminal's use would be limited to two or three short connects a day.

IHC marketing people are delighted with the system, even in its present stage of only partial connect to the nationwide IHC sales force. The assistant district manager for the IHC New York office, R.J. Ratliff, claimed that in the short time the system has



The IBM 2721 battery powered terminal enables a salesman to dial one of International Harvester's computers in Fort Wayne and get an over-the-phone voice response on the availability of trucks with customer-prescribed accessories.

been working in his territory, 78 trucks have been located in IHC or dealer inventories and sold with the "quick assistance of 'Audre.'"

The Computer Takes Bow When Media Miss Out

When newspapers in Cleveland, Ohio, and Provincetown, Mass., sought to include the computer in stories on "errors" and "goofs" in municipal affairs, it turned out that the machine wasn't even used in one case and in the other a difference in listing methods was the actual villain.

In Cleveland, a "computer goof" consisting of different input formats delayed the tax listing of Cuyahoga County property values by about a month last fall.

The county recently underwent revaluation proceedings, and the computer rejected 42,000 cards, representing taxpayers who owned more than one property.

The apparent cause was the 1970 method for listing these individuals, a card for each person, with only a notation that multiple parcels were involved. The firm contracted to compile the 1971 tax duplicate listed each property on a separate card.

A computer run matching the

two sets of appraisal cards resulted in the 42,000 rejections, or about 9% of the county's 454,000 properties. The tax duplicate is the total worth of the county's properties for tax purposes, or \$12.6 billion.

The Cleveland Plain Dealer headlined the "Computer Goof," but towards the end of the report the newspaper did explain the cause as different methods used by the county auditor and the firm.

What the local Provincetown newspaper called a "computer error" embarrassed town officials, who discovered that a \$15,000 figure, representing part of Provincetown's indebtedness, was omitted from the 1970 report.

A correction to the "computer error" will have to be included in the 1971 figure.

The assistant town accountant told CW there was "an error in computing the figure," but it was a "human omission," since computers were not used in compiling the report.

39 Changes Urged for DP Voting

PHOENIX — A nonpartisan committee has recommended 39 changes to the computerized election system used in last fall's election.

Five of the changes have to do with software, while the others deal mainly with voter education and the processing of absentee ballots.

The five-member committee first recommended security to the operating system, which is "just as subject to tampering" as the application programs.

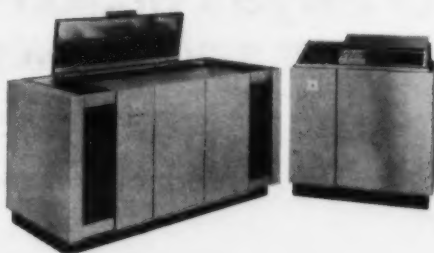
The head of the Maricopa County Democratic Central Committee, Mike Marusich, who appointed the election review committee, emphasized he was "completely satisfied that we got a good count." The committee was appointed to assure continued protection against error and fraud.

Other recommendations included audit of the programs

before and after the election by an outside firm, a "programmed comparison" between the number of ballots processed for each precinct and the number of good ballots reported by the precinct election boards, elimination of precinct header cards, summary cards, and program control cards because of human elements (additional handling), and providing auditors with system control logs to assure that all programs used were in fact audited.

Steel Plant Analyzes Costs

SHEFFIELD, England — Dunford Hadfields is using a Honeywell 200 in an effort to reduce the cost of raw materials used in the manufacture of alloy steels. The system will provide a daily analysis of cost factors for the staff responsible for allocating resources, and will also be used for stock control.

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N.Y. Power Reserves Chilled

NEW YORK — It wasn't the heat, or the fuel shortage. Both of those problems seem to have disappeared.

It was the bitter cold wave that caused a 5% reduction in power throughout the state last week, as power reserves diminished to about 2%. The "brownout" lasted three and a half hours.

Most computer manufacturers estimate their equipment can withstand sudden power drops of 10% before damage, garbled data, or other errors might occur. Electric motors, such as those used in tape or disk drives, and in air conditioning units, are also susceptible to damage in low-voltage situations.

Consolidated Edison said that, in addition to the uniform brownout (probably too small to be noticed by most customers), selected major users were telephoned and requested to cut back on non-essential uses.

It was only the second time in history that New York experienced a January brownout, and the only other time was to assist an out-of-state power pool.

Redistricting Schedule Delayed by Programmer

By a CW Staff Writer

COLUMBUS, Ohio — A programming error at the U.S. Bureau of the Census appears to have prevented departing Republican Gov. James A. Rhodes from approving a congressional redistricting plan.

Cause of the current delay was a missing instruction in a program which assigned citizens to various census Block Groups, the basis for redistricting.

A census official said that, in certain areas of large cities, the population count was conducted by mail, according to "strings of addresses."

Enumerators who collected information in person, however, were assigned territories by blocks.

Normally, Block Groups and enumeration districts coincide, explained Deputy Census Director Robert Drury, except in highly populated areas where part of the census is conducted by mail.

Converting the enumeration districts and "strings of addresses" to a common Block Group created a problem, since a missing instruction prevented the program from identifying some people in "strings" which overlapped districts, or from assigning them to the proper Block Group.

Discovery and debugging took about two weeks, Drury related, enough time for the Ohio Legislature to adjourn and Gov. John J. Gilligan to take office two weeks ago.

Police See Use for DP in Rehabilitation

By Edward J. Bride
CW Staff Writer

KANSAS CITY, Mo. — The local police department has a computerized criminal history file used in two states for law enforcement and rehabilitation of convicted felons.

Twenty-eight of the system's 70 terminals are in the state of Kansas, which borders this city. Modeled after the FBI's National Crime Information Center (NCIC), the system is regional in nature even within Kansas City, as portions of three counties are within city limits.

The criminal history file registers wanted persons, plus stolen vehicles and property, like NCIC. It also communicates with the computers at the state Revenue Department in Jefferson City when specifically requested. All but four of the terminals are in police stations.

The others are used by the courts and attorneys in the adjudication process, noted Col. James R. Newman, director of systems and assistant Kansas City chief.

Newman predicted that some day all elements of the legal process would be served by the department's IBM 360/40: the police and sheriff, the juvenile, magistrate and circuit courts, rehabilitation and detention centers, and probation and parole boards.

Newman said the system is

capable of expanding to handle up to 600 terminals, but after about 256 there would be a storage problem.

In current use, a policeman patrolling a residential area at, say 3 a.m., and spotting a "suspicious" automobile, can first inquire of the city system if the automobile is stolen. If not, but if the policeman wants more information, he can request police headquarters to query the state Revenue Department for the identity of the registrant.

If that registrant has been convicted more than twice for burglary, but has been released to the public, and is again "cruising" in a residential neighborhood, the policeman has "probable cause" to stop and question him, Newman said.

The individual's prior convictions will be in the police data bank, Newman continued, but to make the connections between the identity of the registrant and his police record, it would take the specific action of a police operator.

Newman foresees the local use of the computer to follow an individual all the way through the legal process: from "on-line booking" and updating of status (arraigned, acquitted, tried, etc.), to probation, parole, and finally rehabilitation (or back to an earlier phase of the process).

He is extremely conscious of the phenomena of rehabilitation without detention, and said the

Computers Add Strength to Radiation Therapy, Cytology in Cancer Battle

The vital fields of radiation therapy and cytology have received some needed assistance from computers in the fight against cancer.

Two computers will be incorporated into a powerful tool to categorize "abnormal" and "normal" cytological specimens used in the detection of uterine cancer in a pioneering project currently under way in the electrical engineering department at McGill University in Montreal.

The computers will be part of a system designed to improve the speed and accuracy of identification of abnormal cytologic specimens.

"Each year, millions of women throughout the world are given a simple diagnostic test for uterine cancer," says project director Dr. Martin D. Levine, "in a procedure that involves the analysis of a smear on a slide. The number of women taking these annual tests has steadily increased in recent years creating a volume problem for the medical laboratory."

The McGill research team is attempting to formulate an automatic method for separating normal from suspicious slides, so that the major effort of the cytology laboratory can be invested in a more searching analysis of slides showing abnormalities.

An image digitizing system, called McScan, processes each smear directly on the cytological slide under magnification. Data from the microscope is digitized and processed by a DEC PDP-8

minicomputer. Additional and more detailed analyses are then performed by a DEC PDP-15 medium-scale computer.

Included in the system are a standard PDP-15/20 computer with 8,192 words of core memory, a bus converter, an interprocessor buffer and a PDP-8 computer.

Radiation

Radiation therapy has also received a boost from a minicomputer-controlled automation package for the Varian Clinac models 4 and 35 linear accelerators.

The new system, Cart (Computer-Assisted Radiation Therapy), uses a Varian 620/i gener-

al-purpose digital minicomputer and standard cassettes for storing each patient's individual treatment program.

Varian said the automation package offers tumor treatment centers faster setup times, capability for treating more patients per day, verification of treatment parameters, computer control of Clinac positioning, beam size and direction, and substantial reduction of the possibility of human error.

A feature of the Cart system is the convenience of an individualized cassette for each patient. The cassettes carry the patient's diagnostic history and treatment program, as prescribed by the physician or radiologist.

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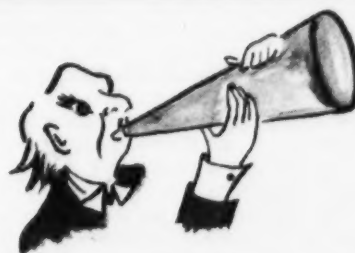
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Editorial

One-Way Streets

The problem with most computerized billing systems is that they are just that and no more. They are de facto programmed to ignore all complaints and problems and to single-mindedly collect the bills.

But why can't they be two-way streets? The vendor has all kinds of variables built into the system for his convenience, so why can't he make a few options available to the customer?

When bills are returned with payments, the information is entered into the system either by a keying operation or on some sort of form. It would be very little problem for the person performing this task to enter one or two additional characters in a special field.

Data for this field would come from a special section of the bill set aside for customer use. By checking the appropriate box, the customer could indicate such things as "merchandise ordered but not received" or "merchandise returned for credit."

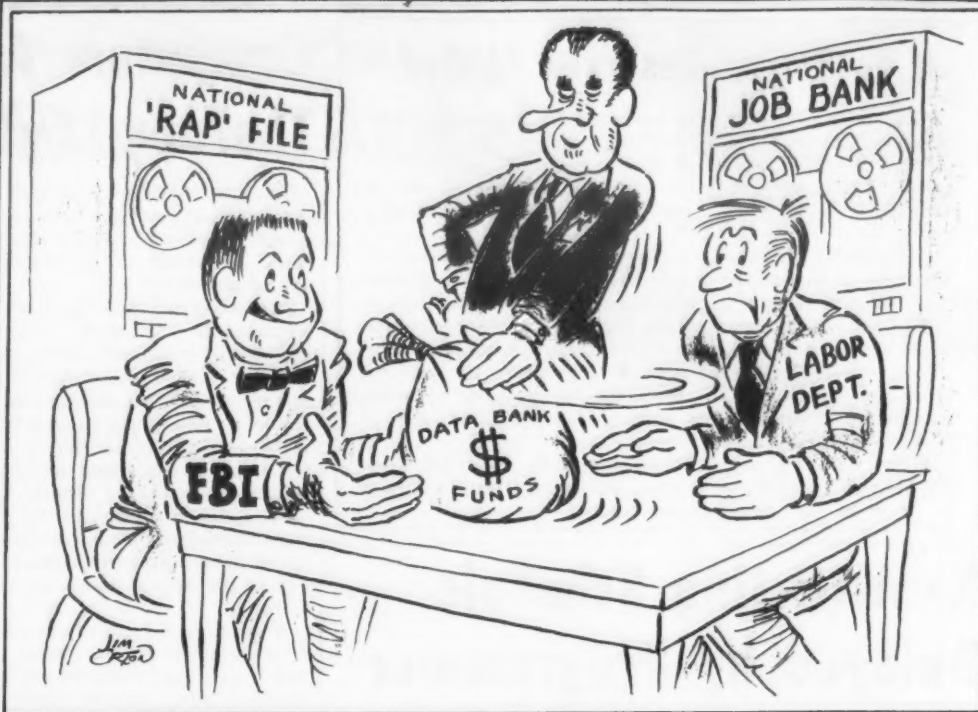
Once a "customer problem" character was entered on the customer's record, the system could ride herd on it to see that action was taken within a predetermined period. And, most important of all, it could keep the customer informed.

On his next bill, instead of printing the typical "pay or else" message, it could print, "Your complaint about merchandise delivery has been noted. If shipment has not yet arrived, please subtract amount from bill and check below."

Depending on the critical nature of the merchandise involved, the system could initiate a trace after the first complaint or wait until the second complaint was received.

What the system does to solve the problem really is less important to the customer — and the vendor's public relations — than what the system tells the customer.

Nothing is more irritating than to have a human being at the vendor tell you that everything has been straightened out and then have the computer go right on dunning you.



Letters to the Editor

Omissions, Errors Covered by Insurance

The article "Let Customer Beware in Computer Contract" written by Edward Bride [CW, Jan. 13] was of great interest. Of special interest was his comment that insurance was now available for errors and omissions.

We are interested in securing

coverage, but so far, have been unsuccessful in finding an insurer.

Harry McColm

Engineering and Management Systems Corp.
Los Gatos, Calif.

The St. Paul Fire and Marine Insurance Co., St. Paul, Minn., has a Data Processors Errors and Omissions Policy, but coverage is restricted to liability incurred "out of the performance of data processing services for others," Ed.

Facilities Management: Viable in Long Run?

I was pleased to see Malcolm Stiefel suggest in his facilities management article on Jan. 13 that Brandon Applied Systems, Inc., among others, might well enter the facilities management field. In principle I agree with him.

However, I am not yet completely convinced that facilities management is a viable business long-range, much as I felt about computer leasing and time-sharing in 1966 and 1967.

While the industry is suffering from severe management problems, it is entirely feasible to consider facilities management as a solution. However, I am willing to bet that most top management would rather not give up direct control of one of their most vital resources. Thus I doubt long-range viability. Of course, I have been wrong before.

Dick H. Brandon

Brandon Applied Systems, Inc.
New York, N.Y.

What Does Language Owe to Computers?

Art Strickland's column "Language Owes Much to Computers" [Jan. 13] hit a nerve that compelled me to rebut his statements. Even if Strickland was being satirical, he is way off base in claiming for computers the change in the English language.

Computers are only a San Francisco, Calif.

"Johnny-come-lately" to the language scene and the only changes they have rendered are in the areas of reducing readability, understanding, warmth and personal injections. In other words, like everything else computerized, it becomes more rigid and cold.

Also, realistically, the much-heralded "automation" is nothing more than an extension and refinement of the machine age which made giant advancements before any of us were born.

Geo. E. Smith

President
Los Angeles Typesetters Assn.

You and Strickland are making the same point, but in different ways. Ed.

Lack of Sales Ability In Software Blamed

In your Dec. 16 issue of CW you gave space to the "Human Cry of Monopoly" again. Although the article written by Phyllis Huggins was titled "Software Industry's Growth Hurt by Immature User," it dealt mainly with the problems of the software industry's competition from moguls like IBM.

I take offense to this approach for reasons relating to both of the above. Bauer is crying in his beer because of his industry's inability to sell software. It's not the problem of the immature user or the monopolistic IBM, but the lack of sales ability in the software industry that's hurt Bauer. When things were booming, the software industry was growing by leaps and bounds and there wasn't an overabundance of DP school graduates.

He didn't have to worry about being a salesman. Now's the time when you fish or cut bait. It's not time to bag and carp about your competition or ask for federal controls to protect you. Get out and sell, if you have a product.

Russell H. Hutchins

Federal Government's HUD Program, Afips Action May Offer Hope to Jobless

WASHINGTON, D.C. — Somebody must have heard us — and others who have been clamoring for action — on the problem of professional people unemployed because of the economic recession.

In my column on Dec. 16, I discussed the unresponsiveness to the unemployment problem of both the Federal Government and some of our professional societies. I singled out the American Federation of Information Processing Societies for its lack of awareness to industry needs evident at the Fall Joint Computer Conference in Houston last November.

Now there are signs that both the Federal Government and Afips are getting away from their apathy.

The Nixon Administration is expected to make a decision shortly regarding a proposed plan to use unemployed aerospace professionals — including computer people — in an experimental retraining project.

The purpose of the project would essentially be to utilize these talents in other areas of need — such as urban programs.

A number of federal agencies have submitted suggestions for retraining out-of-work technical people, and one of the most interesting comes from the Department of Housing and Urban Development's Model Cities Division.

In short, HUD's program would recruit, screen, orient and place 1,500 aerospace professionals and 500 Vietnam veterans in available state, county and local government positions.

"Over 35,000 unemployed aerospace technicians," according to HUD, "are now in the labor market."

"A large majority would opt to leave the aerospace industry for stable public employment; most would be willing to take a salary cut to do

so. Profiles suggest an ability to select a sizable sample whose backgrounds reflect social science undergraduate degrees or relevant substitutes; general managerial experience and/or backgrounds in areas compatible with identified local government jobs, while in the aerospace industry; urban avocation; and willingness to relocate, etc."

HUD is opting to implement its suggested program in March with the recruitment and ultimate placement of up to 350 people. Individuals would be selected from four or five of the areas hardest hit by aerospace employment. Potential employers would come from Model Cities, counties with Model Cities and states with Model Cities.

"The total cost for (the program) will approach \$4 million or approximately \$2,000 per participant," adds HUD.

Meanwhile, Afips is planning to act, too. Dr. Jack Moshman, general chairman of the 1971 Spring Joint Computer Conference to be held in Atlantic City, N.J., said that Afips does plan to have a session on employment and professionalism. He also discussed a charge of inertia leveled at the society by Joan Dublin of Computer People for Peace in a letter to this writer.

She wrote that the organization had sent a letter to Moshman "in October, requesting that questions of unemployment and layoffs be included at the Spring Conference. In November we received a letter from him stating essentially what your (Dec. 16) article outlined. I quote Moshman: 'I am sure you must realize that the organization of a meeting of the size and complexity of the Joint Computer Conference requires a certain adherence to schedules and timetables...' In short, although we requested a modification to the SJCC in October we were turned down due to time requirements."

Moshman explained to this writer that he offered CPP the opportunity to organize its own meeting and that Afips would provide space at the Convention Hall for it. The topic, Moshman said, was left to CPP.

D.C. Data-Line
By
Alan Drattell



Challenge From Watson Research Center

Sorry Sally, But I Still Say Overhead Can Be Simple

Last week I had the pleasure of receiving a letter from Sally Dennis of the Thomas J. Watson Research Center which challenged my claim that overhead is a simple problem.

The only actual evidence that she brought forth was to claim that I had muddled up infinite overhead, and zero overhead in an example which, even if true, hardly condemns the method, but just my arithmetic.

But at the same time I thought that it might be worth while going back and looking at the method I had used [CW, Dec. 16].

At that time I said that the overhead was simply the unnecessary time used, over and above the time required by the hardware, to do a particular job using the software concerned.

"It is hard to think of anything simpler, provided that you know the job and the specifications of your hardware, or at least the

The Taylor Report

By Alan Taylor, CDP



\$64 Questions *	Hardware Overhead Calculation *		
	Isam (minutes)	Theory (minutes)	Overhead
Mod 40	110	4	106 (2,650%)
Mod 50 Part 1	69	4	65 (1,600%)
Mod 50 Part 2	16	3	13 (433%)
Mod 65	24	8 to 10	14 to 16 (140%-200%)

*See CW Dec. 16 and 30-Jan. 6 for details.

Table 1. The time taken by Isam for four specific situations against the theoretical time necessary for the functions, based on machine specifications.

main ones, like the speed of your tape units, the number of paths from a disk control unit to the core memory, etc. But it does involve these, so perhaps Miss Dennis had a point.

Another Method

There is another method which does not involve these, and is perhaps simpler yet. This measures overhead simply by comparing the performance on the same job of different pieces of software.

I do not like it very much, because it gives software overhead as being too low, in my opinion; and also because it is

not often available. But it is a simple method, and, as it happens, I do have the necessary data — so here goes with a comparison between the method I originally used, and this simpler method.

Tables 1 and 2 illustrate the different approaches. In both cases the left-hand column shows the length of time taken by Isam to handle various \$64 problems.

The next column shows the length of time that theoretically we were able to calculate as being necessary from the hardware point of view, or in the case of Table 2, the length of

\$64 Questions	Software Overhead Table		
	Isam (minutes)	Amigos (minutes)	Overhead
Mod 40	110	7	103 (1,400%)
Mod 50 Part 1	69	9	60 (650%)
Mod 50 Part 2	16	7	9 (130%)
Mod 65	24	12	10 (75%)

Table 2. The time taken for four specific situations where Isam and Amigos were compared. The right-hand column indicates the Isam overhead in terms of extra minutes spent in handling the same job on the same machine.

time taken by Amigos. The last column in each case is the overhead involved.

Comparing the Overheads

Table 3 shows the relationships of the two overheads. It can be seen that there is still some way to go. Amigos has apparently removed most of the overhead, but there is still some available.

I do not know of any other good definition of overhead beyond these two, and I do not think that either one is particularly complex.

Indeed I find both a lot less complex than trying to understand chapters out of any of the

IBM manuals describing Isam or their other software. Perhaps the real objection to my calculations is that they are sufficiently simple so that people can actually understand them!

So there is yet a simpler method for calculating overhead. Now that I have picked up the challenge from the Thomas J. Watson Research Center — I wonder just how Miss Dennis will argue that overhead cannot be simple.

Over to you, Sally!

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Letters to the Editor

Different People Are Logical

In Different Ways, Reader Says

Alan Taylor has a point that consumer billing systems could be improved [CW, Nov. 18] but his second example concerning the return of an invoice is unconvincing in parts.

Many statements ask not only for a return of the statement (or portion thereof) with the payment and a listing of the account number of the check, but for the account number of the return envelope as well. One certainly gets the feeling that the quest for information is overdone.

But the system designer probably is justified in his belt and suspenders approach. He hopes that at least one of his requests will be met, thereby increasing the probability that an incoming payment can be identified correctly. Logically one account number quotation should suffice, but I don't think it is arrogant to assume that different people are logical in different ways.

Taylor, for instance, upon being asked for a "certificate number" proceeds to look for an "invoice number," and overlooks the clearly marked certificate number, 4894941.

With this kind of a response from a computer professional, the system designer may be justified in his doubts about the general public's ability to follow simple instructions. If gold rusts, what shall iron do?

I agree with Taylor that if a return of the statement is asked for, a duplicate or stub with

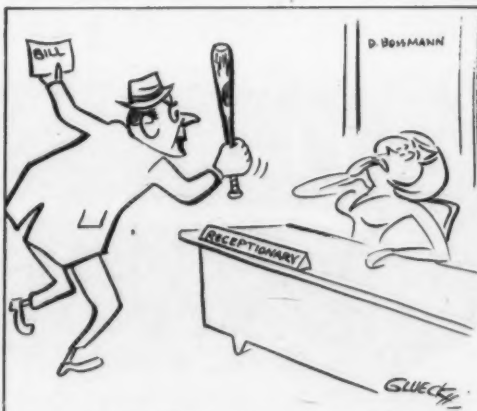
essentially the same information should be provided by the biller.

It is a good idea to list the account number on the check. Somewhere along the line the check must be separated from the statement and subsequent identification or proof of payment is much easier if the account number is known.

I agree with Taylor that a "please return" in place of the "must be returned" would improve the notice. I also agree that the system designer should take user reaction into account.

Martin Hochdorf, Chief,
Computing Center

Tennessee Valley Authority
Chattanooga, Tenn.



'Take me to your computer!'

\$64 Questions	Comparisons of Overhead	
	Hardware %	Software % Isam vs Amigos
Mod 40	2,650	1,400
Mod 50, Part 1	1,600	650
Mod 50, Part 2	433	130
Mod 65	140	75

Table 3. Percentage of overhead as calculated against the hardware specifications, or as observed compared with Amigos. The table indicates that Amigos, while able to save much of the overhead, still has some distance to go before it is totally efficient in using the hardware.

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Human Activity Slowed by CO

MILWAUKEE, Wis. — Preliminary test results of a computer-aided research study at the Marquette School of Medicine show carbon monoxide in heavy traffic or severe smog conditions slows down the activities of volunteer test subjects to a marked degree.

Researchers are exposing the subjects to increasing levels of carbon monoxide for up to 24 hours.

Dr. Richard Stewart, environmental medicine department chairman at the school, said a person exposed to high carbon monoxide concentrations for several hours develops a headache, loses manual dexterity and has a noticeably longer reaction time to stimuli.

Using the IBM 360/40 to pinpoint levels at which CO and other chemicals impair peoples' health, the study aims at providing information to aid in the formulation of air pollution control standards.



A volunteer's ability to exercise while breathing various levels of carbon monoxide is evaluated by a computer-aided research study. An IBM 360/40 compiles and analyzes data from this and other tests at the Marquette School of Medicine.



Ira Schonfeld and Tom Salter watch as a computer program prepared by the Epic Junior Achievement Co. is checked out on a Univac 9300 at the Univac Division headquarters in Blue Bell. The Epic JA group worked through the summer.

JA Students Fit Into Program

BLUE BELL, Pa. — A group of Norristown, Pa., high-school students, who decided to give up their summer vacations to develop computer programs under the auspices of the Junior Achievement (JA) organization, have acquired DP training as well as business experience.

In June, 11 students — all juniors or sophomores — decided to complete three computer programs they had already started for the Univac Division of Sperry Rand Corp.

They named their venture the Eagle Programming Imperial Co. (Epic).

Normally, JA groups sponsored by local companies, which provide adult advisors, make such products as ceramic dishes and lamps, and sell them to relatives, friends and employees of the sponsoring companies.

Miniature Company

Each JA group operates as a miniature company, complete with executive officers, financial statements with detailed figures on costs, sales, net earnings, etc.

When Anthony Anderson, a Univac software specialist with Univac, decided high school students could be taught to program, he contacted Armand Adams, Univac's community relations manager. The support of the Delaware Valley JA staff and the faculty at the AD Eisenhower High School in Norristown, as well as Univac employees was enlisted.

Following two and a half months of theoretical and practical hands-on computer experience from the Univac advisors, the Epic group prepared written proposals outlining special features of the three programs they were planning to undertake for Univac. The proposals included price and delivery schedules, and were accepted.

Three Projects

The group was organized into three project teams. Roland Bauer headed project Margo, Fred Hartman was in charge of project Stat, and Ira Schonfeld led project Plot. Each project was designed for the Univac 9000 series.

Margo is a Report Generator Program for performing business applications on the Univac 9200 and 9300 systems. The program is compatible with a program of the same name developed originally for the Univac 1004 computer.

Stat is a statistical subroutine package adapted to the requirements of quality control applications in industrial production situations and Plot is a general plotting program with histograms for the Univac 9200 bar printer.

When it was clear that the programs could not be completed by the end of the summer, the students agreed to continue the work on Saturdays to fulfill their contractual commitment. Programs were tested and debugged on Univac computers at the Univac Marketing Education Center and on a Univac 9200 operated by the Norristown Area School District.

UK Tire Maker to Use Computer for Control

STOKE-ON-TRENT, England — One of England's first applications of on-line computer systems for the rubber industry will be installed by Instem Ltd. at Michelin Tyre Co. Ltd's new plant here.

The system will use a DEC PDP-8/L computer to control the plant, the process sequence, and delivery of materials. A second PDP-8/L* will be used as a standby.

Instem is undertaking overall design, programming, and assembly of the equipment at its factory at Stone.

The Multiplexer That Lives Up To Its Claims

It was no small feat for a relatively new company to become the number one multiplexer manufacturer.

It took superior engineering. The kind that gave you the features you desired . . . like operation from 2 to 38 channels. And system flexibility . . . the ability to perform equally well in a point-to-point or multipoint (full contention, contention/dedicated, or full dedicated) system. Inter-mix capability of 110, 134.5, 150, and 300 bps (other speeds optional). Ability to intermix a high speed 1200 or 2400 bps channel. Powerful built-in error detection for control functions. Fully automatic synchronization. Special function transmission.

It took an experienced staff. The kind that knows change is inevitable. So it's child's play to add extra channels. Or to intermix additional speeds.

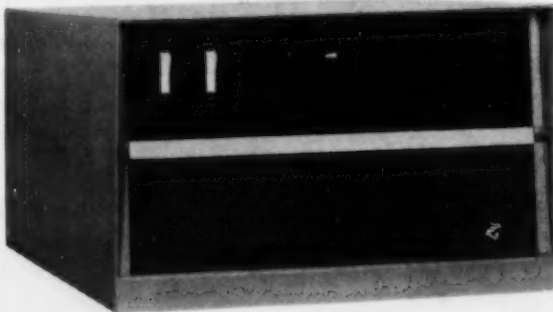
And, we realized that you wanted to know full system status at all times. So we built in highly sophisticated, yet simple, diagnostic capability—all concisely displayed on the front panel. And we made two special test cards—a dual channel test card and a system monitor and control card—to further aid in system diagnostics.

Not only did the TT-2000/3000 work well in our labs. It worked like a charm in your time sharing, reservations, stock brokerage, and management information systems. Ultra-simple installation. And practically maintenance-free.

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TEL-TECH CORP.

In Canada: Canteltech, Ltd.,

January 27, 1971

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Random Notes

Conversion Service Produces ANS Cobol

CHERRY HILL, N.H. — A conversion service that includes testing and documentation is available from Computer Dynamics Corp. (CDC). It includes the ability to convert Autocoder to Cobol, or "second generation" Cobol to ANS Cobol or Fortran as required.

CDC uses a combination of automatic and manual conversion techniques so that "all" conversion problems can be handled.

The service costs \$1/source card from 401 Cooper Landing Road.

Paden Runs Payroll For Food Companies

DALLAS — A payroll service specifically designed for small or medium operations in the food service industry is available from John K. Paden Co.

The system is said to particularly useful in handling the rapid personnel turnover characteristic of this industry. In addition to preparing current payroll checks and weekly information, the system also produces the quarterly 941-A and annual W-2 forms for the user. Paden is at 5838 Live Oak.

Bank Transit System Handled by Package

BOSTON — A proof and transit system for banks called Shawmicr is suited to high volume use, according to the distributor, Cullinane Corp. Its ability to fit into a 26 K partition permits use of dual partitions and entry from two 1419 Micr sorters, for faster processing.

Shawmicr was developed by the Shawmut National Bank here. It includes separate programs for each of the steps in the transit process, and utility programs to print the Micr documents and create or update files on either IBM 2311 or 2314 disk units. The system costs \$25,000 from One Boston Place.

Computeria Installs 'Mail' on T/S Nets

BRAINTREE, Mass. — A time-shared service called Mail is used to process selective mailings from a master file containing company codes, names, addresses, individual's names and titles.

Distributed by Computeria Inc., Mail allows user-designed selection criteria including SIC numbers, Zip codes, codes for company, titles or functions. It provides for the printing of listings, labels, envelopes or letter headings on Typetype or mixed upper/lower case font terminals. Computeria is at 14 Wood Road.

Wholesalers Can Use Accounting Service

BLUE BELL, Pa. — The Datafile/500 time-sharing service designed to provide data processing for companies in the wholesaling industry is available from Datafile Systems Corp.

The service provides invoicing and a range of accounts receivable, inventory, sales and profit reports. The service can automatically adjust reorder points to changing lead times and balances the company said. The firm is at 1777 Walton Road.

Programming Eased by 'Force' Macros

NEW YORK — Most 360 commercial programming problems can be handled with a language called Force, according to the developer, Data Force Inc. (DFI).

Transition from any of the commonly used 360 languages is said to be "relatively painless" since Force includes the ease of writing (and reading) Cobol, the machine efficiency and core utilization of BAL and the matching and table-handling logic of RPG, DFI said.

Force's relationship to the older languages is further emphasized by the fact that the user may intersperse standard BAL coding with Force source coding, the program listing is in BAL format and, as an option, the user may produce an expanded BAL source deck as an output from the Force compilation process.

The normal force output is a load-and-go object deck including all job control cards necessary to test the program. The BAL source deck output may, however, be separately assembled on any IBM assembler (level D and up) without any further use of Force, the company said.

Force commands are closely akin to Cobol in content and meaning. Force includes the PERFORM statement, with the "varying," "until" and "times" options, in addition to IF, with both relation-tests and condition-tests, MOVE

and GOTO. It also includes a PICTURE clause, used with an edit instruction for report formatting.

The syntax of Force is identical to that of macro instructions in 360 Assembler Language. There are op-codes and parameters, both key word and positional, so that compound operations can be described in a minimum of coding.

Force can handle one card reader, one card punch, up to 10 printers, 10 tape

files and 10 disk files. The disk files may be on either 2311 or 2314 units, with automatic execution time interchangeability between the two types.

Force can be purchased for \$16,000 plus \$50/mo for program maintenance, updating and education. The language is also available for \$100/mo plus \$2 for each of the first 100 compiles each month. Data Force Inc. is at 875 Avenue of the Americas.

Helps 360 Users**'PMS' Checks Peripheral Speeds**

MIAMI SHORES, Fla. — How fast do peripherals actually operate? Do they slow down and extend data processing time?

Most 360 users can't answer such questions. The peripheral units move far too fast or erratically for visual checking, and most maintenance routines check accuracy, rather than speed of data transfer. But users of the Peripheral Monitor System (PMS) from Computer Efficiency Corp. (CEC) feel that they have the capability to accurately monitor their 360 peripheral equipment.

PMS is a stand-alone software package that compares the actual operating speed of the peripherals to their rated speeds, and reports variations to the user. The comparisons are based on a table of values for each peripheral, built into the program. This table can be extended to include any known specifications, CDC said.

In one PMS test, a user found that his line printer, rated at 1100 line/min actually operated at only 805 line/min. The printer was replaced.

In another test, disk drives operating 30% and 46% below manufacturer's specifications were identified using PMS.

The flexibility of the PMS table approach has been used by some users as a way to determine which manufacturer's peripherals to install when upgrading their system.

One user told CW that his need to get data on which to base three major hardware changes was his main justification for getting PMS.

The maintenance capability provided by PMS was the main advantage cited by another user.

The system takes 15 seconds to monitor a peripheral and those who use PMS for normal maintenance apparently run it several times a week.

The package operates on any 360 and does not require any operating system support. It is available from CDC, 9999 NE 2nd Ave., for \$4,000.

NBS 'Speed' Plots Sensor Data

WASHINGTON, D.C. — Users can manipulate and plot data obtained from sequential scans of up to 120 laboratory sensors with a Fortran IV program called Speed, available without cost from The National Bureau of Standards (NBS).

Speed is an acronym for Systematic Plotting and Evaluation of Enumerated Data. The program contains 11 subprograms and operates in three phases, called Plot 1, 2, and 3.

Plot 1 produces printouts of data before and after processing, and also plots datum points. The input is usually on magnetic tape that has been transcribed from paper tape encoded in the laboratory.

Plot 1 produces a graph of readings from each sensor against the readings of

an independent variable, such as a clock or an instrument measuring applied force.

Plot 2 manipulates and combines readings of instruments to create new data classifications which are also plotted.

It uses the matrix of data formed in Plot 1, NBS said, but can also accept raw data encoded on punched cards.

Plot 3 uses proprietary software to draw any of the plots obtained in Plot 2 as high quality graphs, suitable for printing.

Speed has been implemented on a Univac 1108, but since it is written in Fortran IV, adaptation to any other processor should be relatively simple, NBS said. Inquiries should be addressed to John M. Smith at the NBS Research Division, here.

T/S Network Lets Users Shift Processing to Non-Prime Time

HOUSTON — The Computer Complex Inc. time-sharing network now has a deferred processing option for operations that can be put off until non-prime hours at the Houston computer center.

Deferred processing is an extension of the previously available remote processing capability which allows the user to specify commands to be executed immediately after he disconnects from the system.

The deferred processing capability goes one step further and allows the user to take advantage of time efficiencies gained by running his programs during low usage periods. Output from the deferred processing run may be stored on the computer's magnetic disk file for examination and evaluation at the user's convenience.

Computer Complex supports Basic, Fortran II and IV, and several interactive debugging, editing and simulating packages.

The system can be accessed by local lines to 21 Computer Complex offices, or through nationwide In-WATS service. Computer Complex Inc. is at 6400 Southwest Freeway.

Package Generates 1099 Forms for IRS

SAN FRANCISCO — A package of programs, System 1099, intended to aid accident and health insurance companies to comply with IRS requirements is available from American Information Development.

The system, priced at \$1,800, allows companies to collect information regarding claims payments to health care providers on a continuing basis throughout the year.

American Information Development is at 2134 Van Ness.

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Brokers to Form Shared-Use Data Groups

By Don Leavitt
CW Staff Writer

Tariffs that allow sharing of data channels have spawned at least two brokerage operations aimed at providing the communications user "significant savings" over the cost of unshared lines.

Both Systems Architects Inc., Randolph, Mass., and Communications Facilities Exchange, Ramsey, N.J., expect to help build effective user groups. They plan to bring together prime users with surplus channel capacity and prospective users who could operate on such available lines.

Some tariffs such as Bell's Series 11,000 offering already allow the sharing of multiplexed data channels. Other tariffs have been called for by the Federal

Communications Commission in connection with its recent decision to make line sharing available to all Telpak users.

Each broker, in addition to bringing users together, will provide software-based support ser-

Communications

vices to smooth the development of the user groups.

The brokers will not be part of any users group and participation would be determined by direct negotiations among the users. Brokers fees would be based on the amount of money that shared usage saves the user, a spokesman said.

By grouping together, users apparently can save substantially on the inter-exchange mileage

charges they might otherwise be billed.

SAI said that the rate schedule for an FX line, for example, starts at about \$3.30/mi, but a user can pay as little as thirty six cent/mi for the same service on Telpak D under a sharing arrangement.

The savings under the shared-use tariffs apply only to the mileage charges, however, and not to "termination charges."

Each user in a group is still responsible for the terminals and interfacing the terminal with the Bell network.

Some tariffs such as Bell's 260 require fixed charges "per terminal," so that more complex networks can have heavy surcharges.

Each of the brokers indicated that they expect to be able to create user groups anywhere in the country.

Conference Hits Carriers For Delaying Data Nets

LONDON, England — The slow rate of the world's common carriers in providing data transmission services to computer users, will spur the growth of private incompatible data networks. This view was expressed by data experts attending a session on computer networks held here recently.

By the time significant common carriers services are available, computer users will have mastered the problems connected with private systems and they will be reluctant to change their facilities, according to D.G. Holloway of Plessey Limited, UK.

James Martin of IBM also stressed the importance of public data services. They would, he said, revolutionize corporate communications by making possible full integration of systems on an international scale. Functional networks within companies had tended to evolve separately, superimposed on each other with little interconnection and infrequent rationalization, resulting in mixed systems, he said.

The need to rationalize corporate computer data networks had now become an urgent priority, yet everywhere the process was held up by the slow development of public transmission services, Martin said.

Public data trunks, such as Datran, and a proposed microwave "backbone" across the United States, were a force for centralization, with computer sites being drawn to main transmission lines sending or receiving data from remote terminals at insignificantly low tariffs, Martin said.

The advantages that can accrue from nationwide common carrier services were described by F. Heart and S.M. Ornstein of Bolt, Beranek and Newman Inc. They described the 50 kbit/sec ARPA network linking 20 major projects at universities and research sites across the U.S.

The session was part of a state of the art lecture series being held in Europe by Infotech Ltd. of London.

FCC Stalls Increase Requested by AT&T

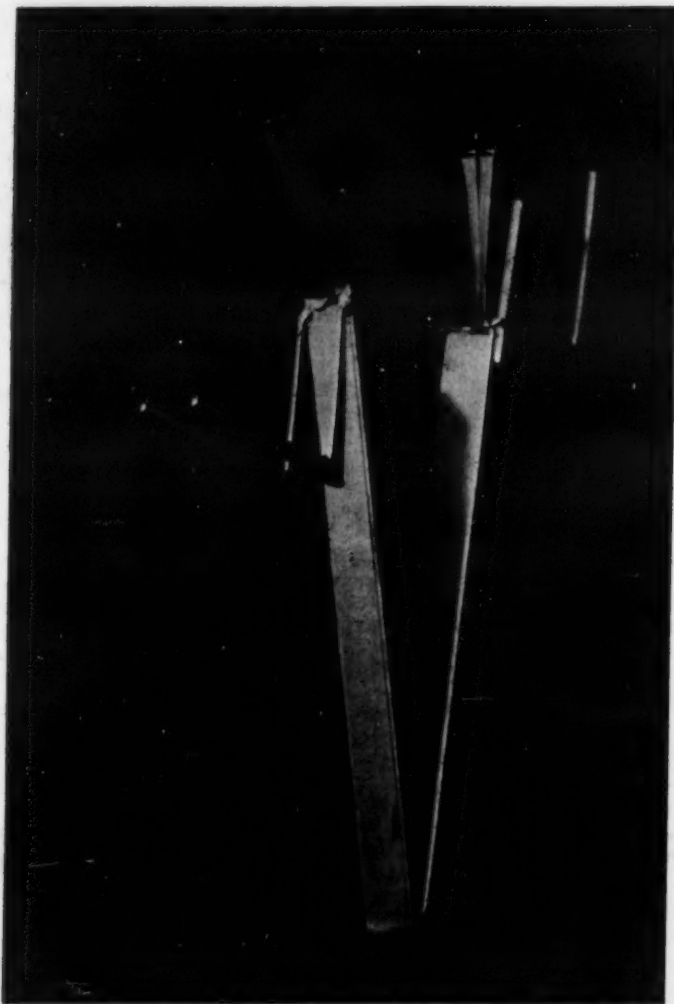
WASHINGTON, D.C. — The American Telephone and Telegraph Company has been requested by the FCC to postpone the effective date of its proposed increases in long distance telephone service pending outcome of an expedited hearing. The rates were to become effective January 19, and would have affected some data users [CW, Dec. 2].

AT&T had asked for increases totalling \$545 million. The commission gave the company special permission to file for lesser rate increases which would produce \$250 million in additional annual net earnings.

In a letter to AT&T, the Commission noted that the rate increase originally proposed would have brought the carrier a rate of return that "far exceeds" the rate of return previously deemed acceptable by the commission.

The commission said that it intended to proceed with hearings so that it could conclude the matter "as expeditiously as feasible."

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January 27, 1971

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Bits & Pieces

Minicomputer Price Dropped 10% by HP

PALO ALTO, Calif. — The price of the Hewlett-Packard 2116C minicomputer has been cut about 10%. The change includes 2000-series time-sharing configurations based on the 2116C, H-P said.

The cut, is expected to reduce the price of a "typical" system from \$50,000 to about \$44,000, an HP spokesman said. This would include a plotter and/or disk units in addition to the minicomputer itself, he said.

Tycom 20/20 Unit Can Be Used As Typewriter or as Terminal

POMPTON LAKES, N.J. — A Selectric-based replacement for the Teletype Models 33 and 35, the Tycom 20/20 from Terminal Equipment Corp. can be used as typewriter as well as computer terminal.

The 20/20 consists of a Selectric typewriter, a baseplate for automating the typewriter, an acoustic coupler, and a logic console for control.

Lease prices start at \$78.50/mo including the typewriter, with maintenance costs estimated at under \$20/mo. The device will be available in April from 750 Hamburg Turnpike.

User Gets Lifetime Guarantee With 'Media' Magnetic Tapes

RESTON, Va. — A user will never have to purchase replacement magnetic tapes for his computer under a guarantee offered by General Kinetics, Inc. with its Media tapes.

Guaranteed for life, the tape is returned to the company for rehabilitation if it fails. For a charge of \$5.50, the tape is either restored to original specifications or replaced with a new reel.

Media tape is certified for 3,200 bit/in. operation and is compatible with all current computer systems, the firm said.

The price of 1,600 bit/in. tape in a 2,400-foot reel is \$13 and it is available on a 48 hour delivery from 11425 Isaac Newton Sq. South.

Polyester Core Strengthens Tab Cards for Heavy Duty

EAST PROVIDENCE, R.I. — A polyester and paper laminate that offers extra strength and tear resistance could be used to increase the life of tabulating cards in severe environments.

Designed for use where rough usage and difficult atmospheric conditions are encountered, Astro-Core by the Chase-Foster division of Keene Corp. has characteristics that go beyond paper in tear strength, dimensional stability, and crease and moisture resistance, the company said.

While conventional card stock can be used 600 times, cards of Astro-core can be used 5,000 times.

Device Reads Kimball Tickets

SAN LEANDRO, Calif. — A Friden device that can read Kimball retail merchandise tickets at the point of sale, the Model 705 is designed for use with the company's Modular Data Transaction System (MDTS).

The Model 705 Merchandise Ticket Reader is priced at \$950 and will be available next summer from 2350 Washington Ave.

Stand-Alone Systems Cheaper

Minis Create Uses for Voice Response

By Frank Piasta

CW Staff Writer

Many users of computer systems are beginning to look to voice response systems for use in applications that were not previously practical due to the high cost of on-line equipment.

The breakthrough has come about with the introduction of minicomputer-based standalone voice response systems from a number of manufacturers.

These new systems offer the user most, if not all of the capabilities of larger on-line systems without taking up valuable mainframe time on his computer.

The user will have to make a choice,

however, between the systems that offer a large vocabulary and those that are limited to a relatively few number of words.

The user who favors a system with a relatively small vocabulary may argue that all of his applications can be implemented at lower equipment cost. Inventory control systems can be done with 64 words, while a credit checking system needs no more than 32, according to one user.

Other applications within the 32-word vocabulary level are real estate listing services and airline flight status reports, users say.

These apparently small vocabularies are useful because of the almost infinite numerical data that can be conveyed with only 10 digits. If properly planned, an application need add only a few key words to convey almost any data, according to the small-vocabulary users.

Not so, say the big vocabulary proponents — there is insufficient security in just allowing numerics to be used to identify a transaction, they argue. Alphabetic data should be added to the vocabulary, they say.

For instance, if a doctor called an audio-response system at the hospital to learn the status of a patient, shouldn't he expect to hear more than a confirmation of the patient number that he keyed? The patient's name would confirm that he had the right person.

This type of application requires another feature — quick and easy vocabulary changing techniques that will allow the user to add new words and delete obsolete words at his own site.

Under the patient information system, new patients would have to be entered, and former patients "deleted" the same day that the events occurred.

This type of application does not lend itself to the common routine in audio response systems that call for the manufacturer to make the vocabulary changes for the user. One manufacturer, at least, Periphonics Corp., is offering a system that allows the user to record and delete the vocabulary in much the same way as a tape recording.

Numbers, Special Characters Can Be Read by OCR Device

MOORESTOWN, N.J. — A low-cost OCR reader from Orbital Systems, Inc. is available in both on- and off-line configurations.

The Orbit I is designed for the processing of turn-around documents in such industries as insurance, banking, and publishing and can process up to 120 document/min.

The unit can read any one of three fonts, OCR-A, 1428, or 12F, but the vocabulary is limited to numerics and four special characters. The company is scheduled to add three more fonts, E13B,

7B, and OCR-B, in about nine months, a spokesman said.

The reader will be sold with an interface for a key-to-tape device, the firm said.

Units to adapt the Orbit I to general-purpose computers, such as the IBM 360 and Univac 1108, as well as such minicomputers as the PDP-8, are being developed.

The reader will sell for \$21,800, with a lease price of less than \$1,000/mo. Delivery is 26 weeks from Fellowship and Church Roads.

PDP-11/20 T/S System Handles 16 Terminals

MAYNARD, Mass. — A time-sharing configuration of the PDP-11/20 that includes a new Basic compiler is available from DEC for under \$5,000 per terminal.

Called the BTSS-11 (Basic Time-Sharing System), the system can support as many as 16 simultaneous users and costs \$49,900. This price includes one local terminal and the interfaces for 16 remote terminals.

The system includes a 16K word CPU, an ASR33 teletypewriter, a disk storage unit with a capacity of 256K words, magnetic tape, ROM, real-time clock, and 16 Teletype interfaces.

The multi-user Basic compiler includes an extended character string handling capability. It allows operation with one- or two-dimensional matrices, and the compiler can support a range of peripherals that allow a user to build and access his own on-line data files.

Basic programs written for other computers can be run on the BTSS-11 system with little or no modification, DEC said. Other features of the compiler include: the capability to use three types of data, floating-point, integer, and character strings; the ability to segment, chain, or overlay programs; and the ability to use complex FOR statements and data arrays.

First deliveries of the BTSS-11 are scheduled for April, 1971.

Tracor Cuts Disk Prices To 15% Below IBM's 2319

AUSTIN, Texas — Priced 15% below IBM prices, the Tracor Data Systems TDS-733/833 is the lowest priced system yet announced as an alternative to the IBM 2319 for 360 disk users.

The Tracor systems are available in one to nine spindle configurations allowing the disk user to acquire the exact number he requires, the company said.

For a controller and three 2314-type drives, the Tracor price is \$2,108/mo. A six-spindle disk system rents for \$2,958/mo, and nine spindles for \$3,808/mo. In contrast, a nine-spindle 2319 system from IBM is priced at \$4,480/mo.

WHAT'S THE CATCH TO DATA COMMUNICATIONS?

All the companies in the industry aren't exploding with growth potential. Why? Read DATACAST for a realistic view of the investment potential in this burgeoning field.

The January 10 issue of this twice-monthly publication analyzes the trend in such sub-industry groups as Data Communications Systems, Data Services, Data Terminals, Telephone/Interconnect, Microwave Transmission and CATV. Incisive analyses of specific companies include:

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each other. An order entered at a remote sales office can automatically adjust a production schedule or a warehouse "pick sheet," print shipping papers on the loading dock, initiate billing, adjust sales totals in management analyses, alert the controller of projected income, and make the VPs smile. All within a few minutes.

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A System Ten computer will accommodate up to twenty workstations and process all twenty jobs simultaneously. It's designed to be used easily by ordinary business people without special EDP training. It uses simple two-wire connections—easy to install. It's ready to go on-line to your mainframe. And most important, its cost is extremely realistic. On the basis of cost per function, a System Ten business computer is the most efficient system available to you today.

To find out how and to get more information about how a worksharing system could work for your company, call your nearest Singer representative or the Sales and Marketing Division, The Singer Corporation, 10000 Wilshire Blvd., Los Angeles, California 94577.

System Ten business computer by Singer



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January 27, 1971

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005900*****
006000
006100 01 A PICTURE X(0080) VALUE SPACES.
006200 01 A-DEF-01 REDEFINES A.
006300 05 AXXA PICTURE X.
006400 05 ABNO PICTURE X(0003).
006500 05 ASEQ PICTURE X(0003).
006600 05 AACT PICTURE X(0005).
006700 05 AX
006800 05 AD
006900 05 AX
007000 05 AT
007100 05 AX
007200 05 AN
007300 05 AL
007400 05 AX
007500 05 AM
007600 05 AX
007700 05 AA
007800 01 A-DEF-
007900 05 FI
008000 05 AD
008100 05 FI
008200 05 AD
008300 05 FI
008400 05 AT
008500 05 AB
008600 05 FI
008700 05 AM
008800 05 FI
008900 05 AD
009000 05 FI
009100
009200 01 D PI
009300 01 D-DEF-
009400 05 DX
009500 05 DB
009600 05 DS
009700 05 DA
009800 05 DX
009900 05 DD
010000 05 DX
010100 05 DT
010200 05 DX
010300 05 DN
010400 05 DL
010500 05 DX
010600 05 DM
010700 05 DX
010800 05 DA
010900 01 D-DEF-02 REDEFINES D-DEF-01.
011000 05 FILLER PICTURE X(0004).
011100 05 DSEQN PICTURE 9(0003).
011200 05 FILLER PICTURE X(0036).
011300 05 DTER PICTURE X(0002).
011400 05 DBRO PICTURE X(0002).
011500 05 FILLER PICTURE X(0022).
011600 05 DANTN PICTURE S9(0008)V9(0002).
011700 05 FILLER PICTURE X.
011800
011900 01 R PICTURE X(0132) VALUE SPACES.
012000 01 R-DEF-01 REDEFINES R.
012100 05 R001080 PICTURE X(0080).
012200 05 FILLER PICTURE X.
012300 05 R082106 PICTURE X(0025).
012400 05 FILLER PICTURE X(0026).
012500 01 R-DEF-02 REDEFINES R-DEF-01.
012600 05 FILLER PICTURE X.
012700 05 R002004 PICTURE X(0003).
012800 05 FILLER PICTURE X.
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013500 07 FILLER PICTURE X(0002).
013600 07 R018SD1 PICTURE X.
013700 07 FILLER PICTURE X(0002).
013800 07 R018SD2 PICTURE X.
013900 07 FILLER PICTURE X(0002).
014000 05 FILLER PICTURE X(0004).
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TURE X(0002).
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ICTURE X(0018).
ICTURE X(0014).
ICTURE 9(0004).
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02 H2-DEF-01 REDEFINES H2.
03 H133198 PICTURE X(0066).
03 FILLER PICTURE X(0066).
02 H2-DEF-02 REDEFINES H2-DEF-01.
03 FILLER PICTURE X(0061).
03 H194198 PICTURE X(0005).
03 FILLER PICTURE X(0066).
019300*****
019400 01 CONSTANTS.
019500*****
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019700 02 WK1 PICTURE X(0005) VALU
019800 02 TST USAGE COMP-3 PICTURE
019900 02 CNT PICTURE S9(0003) VALU
020000 02 BTL PICTURE S9(0010) VALU
020100 02 BTL-DEF-01 REDEFINES BTL.
020200 03 BTLN PICTURE S9(0008)V
020300 02 TOT PICTURE S9(0010) VALU
020400 02 TOT-DEF-01 REDEFINES TOT.
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Many Sources

Software Seen as Key to Effective EDP

The choice of the proper software has become the critical element in the effective development of any user's data processing installation.

Much of the hardware now available or announced includes such broad-range capabilities that it requires a well-tuned balance of software support to do the work needed by the particular user.

The user faced with a need for new software is very much like a person in need of new clothes. In either case, the person who wants the new things can get them through a "do-it-yourself" project, he can buy them off the "ready-to-wear" racks, or he can go to a custom-tailoring shop.

The analogy can usefully be carried even further. The best results from any source depend heavily on good planning on the part of the person who wants the new things, and good skills and good materials on the part of the person who is actually making them.

The do-it-yourselfer, especially if he's handled similar projects in the past, may be able to do the job well, but he may have to call in outside help if things go wrong.

The "ready-to-wear" software package should fit at least reasonably well when it is purchased or it won't be any bargain at all. It may, however, need some final alterations to suit the user really well.

Right Results

The custom-tailoring job should produce just the right results, shaped in exactly the desired materials and with the precise details wanted by the user,

but it will probably be an expensive process compared to the other possible sources.

The do-it-yourself in-house systems and programming staff has to have at least some basic systems software support before it can start to develop its own applications programming. Language compiler or assembly systems, and operating systems, including some of the basic utility packages, are available from the computer manufacturer, or from independent vendors.

In many cases, the choice of language and/or operating system has to be made just as carefully as a seamstress chooses her patterns, materials and essential tools. As the user's situation changes, so may his needs for specific languages.

The user who goes to a custom-tailoring shop for software or clothes must be prepared to provide exact specifications for what is wanted, or pay the expense of modification if he changes his design as the work progresses. The work will be expensive but it will be exactly what the user requests.

To help the user get a better grasp on the whole range of software sources, this supplement includes articles on languages, the types of "ready-to-wear" packages that are available, how a user ought to approach the problem of outside sources, and on some of the systems software that is available.

There are also several articles outlining the tools that are available to determine how effectively the hardware and the software are operating, since the overall capabilities of an installation obviously must be keyed to operating efficiency.

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Applications vs. System Support

User Should Recognize Different Types of Software

By Don Leavitt
CW Staff Writer

Two distinct, if complementary, types of packages fall under the general word "software," and a real understanding of the distinctions could be important to the user.

Unless he has an appreciation of the differences between applications system and system support packages, he may well miss out on opportunities.

System support ranges from operating systems, language processors, and generalized information retrieval systems to conventional utilities such as sort/merges. Although often tied to specific hardware, these "tools"

are not limited to particular applications.

They are, instead, intended to aid the user in his overall operation and are essentially transparent to the non-EDP people who see the installation from the outside.

Application systems, by contrast, are highly visible to the outsider. These are the packages that handle a particular DP chore, from input to output. The cut-over to a new application may involve a change in forms for order takers and stockroom clerks.

Although applications are increasingly being designed so that the output of one becomes the

input for another, individual programs within an application are not directly usable under other applications.

Almost all users need some system support packages to function at all, and they are willing to get these from outside sources. Users are not always able, however, to justify the purchase of application packages. Factors beyond the package's capabilities may well dictate against its acquisition.

As one user explained the situation, the really small installation might well use some of the basic applications "as is." He needs payroll or accounts receivable processing, but he has

neither the manpower nor the skill to build the systems himself.

Here the packaged application serves a need, even if it does not do the job exactly the way the user might have done on his own.

The large-scale installation might also go to a packaged application, with the understanding that the package has to be modified.

The large user has the manpower and the skills available for the modification and maintenance effort, but doesn't tie his staff down with the chore of writing the basic application logic from scratch.

The installation that is moderate in size doesn't necessarily have these options. Management wants more than the package "as is" can provide, but the staff can't afford the time to learn the package logic thoroughly enough to make the modifications and the staff could better spend its time building a system that it

understands thoroughly, rather than trying to understand and then modify someone else's logic.

In any case, before a package is bought and modified, the user should do a complete system study so that he knows what he expects to accomplish with the application.

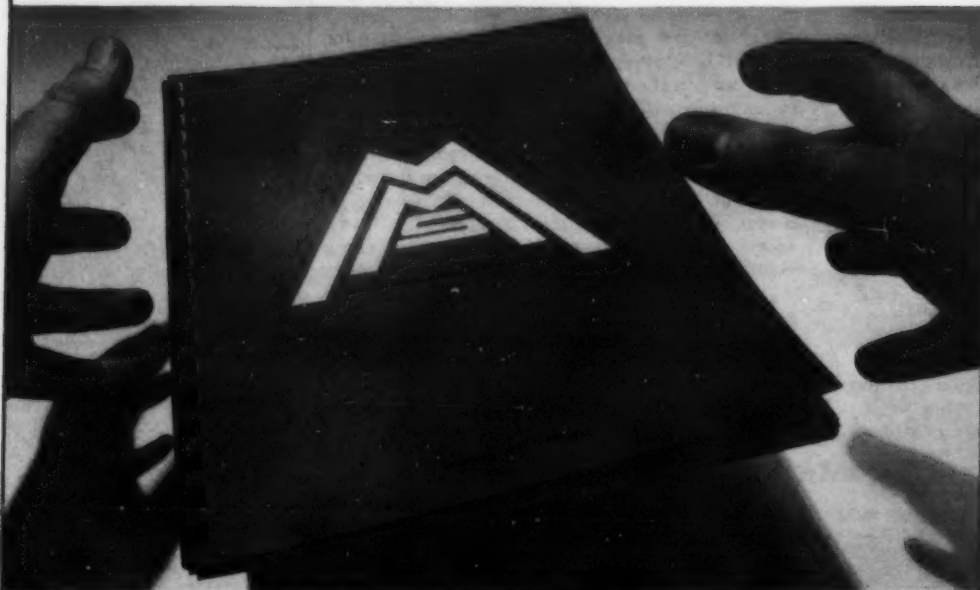
Assuming that a user chooses to use a packaged application and has done a system study, he then has to find the package that comes closest to fitting his proposed design.

The user of system support software, on the other hand, can be freer in his search. Though his hardware forms a rather definitive constraint on his choices, application system designs do not.

The DP manager interested in looking for help in this area can use a "supermarket" approach. He can see what is available and get individualized packages, on the basis that they should prove useful in his overall operation.

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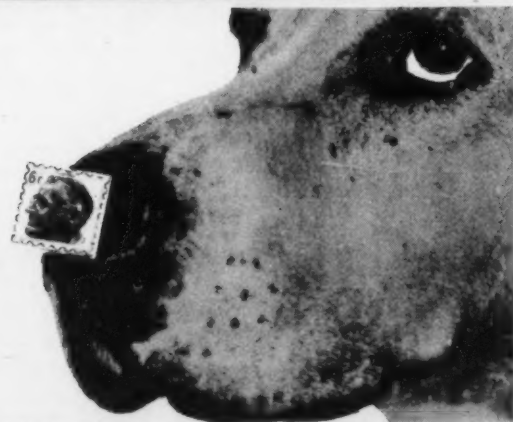
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Standardized Cobol Compilers Give User Flexibility

By Harry T. Hicks Jr.

Special to Computerworld

The new standard compilers allow the Cobol user a greater degree of flexibility than previously available. He can write programs in a dialect that maximizes program transferability, minimizes his current conversion effort, or any number of other permutations.

To utilize this flexibility to the utmost, the Cobol user must examine his objectives and consciously choose his own subset accordingly.

This past year was the year of the standard Cobol compiler. Compilers implementing the standard began appearing early in 1970, led by IBM's OS and DOS ANS Cobol compilers. By year-end, all major hardware vendors had at least announced, and several had released, standard compilers for their most popular lines of equipment.

New Structure

What is a standard compiler and how does it differ from its predecessors — compilers based on Cobol-61 or Cobol-65? ANS Cobol imposes on Cobol a structure different from its traditional divisional organization.

This new structure recognizes the various functional capabilities of the language: nucleus (internal processing), table handling, sequential I/O, random I/O, report writer, sort, segmentation, and library.

Each functional module is further divided into two or three levels of increasing sophistication. Lower levels of a particular functional module (mid and low table handling) are proper subsets of the high level of that module.

The standardization process considered all the elements of Cobol-1965 (plus a few extensions added after publication of that document), eliminated some on the basis of screening criteria (usefulness, redundancy, etc.) and allocated the remainder to one or more of the functional modules at the appropriate level.

The standard specifies a minimum dialect that any compiler claiming to be "standard" must implement. This dialect consists of the lowest levels of each functional module.

Since the low levels of all but three modules are empty, this minimum equals low nucleus, low table handling and low sequential I/O. Any standard compiler that claims a capability greater than this must implement the entire standard module which contains that capability.

The chart compares new ANS Cobol compilers on the basis of their implementors' reference manuals or announcements. The entries in the table indicate the level of each functional module implemented in each compiler.

An additional column indicates an extension that is likely to receive wide implementation; interprogram communication, which is a recent Cobol feature that is certain to be included in the next revision of the standard.

All the compilers surveyed implement far richer dialects than minimum standard Cobol. The only function not widely implemented is report writer, which is a valuable feature worthy of wider use than it has received.

One immediate effect of standardization can be best illustrated by one company's experience in comparing compilers. In 1968, a Cobol compiler comparison report that compared six Cobol compilers was developed.

This comparison required more than 40 pages of tables because the compilers surveyed were developed at a time when implementors could choose their dialects on an element by element, clause by clause basis.

Thus, while all six compilers implemented a common subset, their total dialects were quite varied. In contrast, the chart compares eleven compilers in the space of a single table!

Extended Versions

The majority of these compilers are new versions of existing compilers, extended so that each feature now contains all the

(Continued on Page S/4)

Compiler	Features	Nu- cleus	Table Han- dling	Sequen- tial Access	Random Access	Report Writer	Sort	Segment- ation	Library	Inter- Program Comm
IBM ANS Cobol			High			High	High	High	High	Yes
IBM ANS Subset Cobol			Mid					Low	Low	Yes
Honeywell GE 600			Mid*			High	High	Low*	Low*	Yes
H-200 Mod 4			High				High	High	High	Yes
NCR Century Stage II			High					High	Low	
NCR Century Stage III		High	High	High	High		High	High	High	
B2500/3500			High				High	High	Low	
Univac 1108			High				High	High	High	Yes
CDC 6000			High			High	High	High	High	Yes
CDC 3000			High			High	High	High	High	Yes
RCA Spectra 70			Mid				Low	Low	High	Yes

*implementation of the high level is planned

Comparisons of ANS Cobol Compilers

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New Compiler Brightens Future for PL/1

By Don Leavitt
CW Staff Writer

The PL/1 language has given users a mixture of problems, promises, and potential ever since it was announced in the early days of the 360.

It wasn't known as PL/1 at first, and perhaps that is typical of the language. The original name was to be New Programming Language, but the abbreviation NPL was already being used.

Disadvantages

The problems have ranged from unavailability of the lan-

guage processor to finding that a shift from Assembler to Fortran to Cobol-like coding imposes a variety of additional requirements on the user compared with simpler processors.

If PL/1 coding is clumsy to some users, its slow compilation speed and high-core usage are considered even more serious faults by others.

The generalized code generated by the Cobol compiler for address register loading and PERFORM coding appears to be carried even further in PL/1.

But, if the language has its problems, it also has its good

points, which were stressed by those who have used PL/1 heavily.

The ability to move from Assembler to Fortran to Cobol, as appropriate for the immediate situation, is well worth any problems, according to the users having highly complex application programs.

Beyond that, the Fortran included in PL/1 has features richer than those in the "standard" Fortran processors.

The fact that PL/1 presently is strictly an IBM language is a very definite limitation in the eyes of those who are concerned about

the problem of transferability from one system to another.

There are indications, however, that other manufacturers are at least exploring the possibility of implementing PL/1 compilers on their machines.

Meanwhile, IBM itself has faced up to some of its processor's shortcomings. It has announced an Optimizing compiler for use with PL/1.

The PL/1 Optimizing compiler provides the user with three options: fast object program execution, reduced object program core requirement, or fast compilation.

The Optimizing compiler is said to include default options for use during coding, which are even stronger than the options already available under PL/1-F.

The DOS user will be able to use PL/1-F level language capabilities, with the Optimizing compiler. At the same time, the OS/360 user is expected to gain support for the time-sharing option.

The new Telecommunications Access Method (Tcam) is also supported by the Optimizer.

A source program written for DOS PL/1-D or the OS PL/1-F compiler will, in general, produce identical results when compiled by the Optimizing compiler.

Optimizing for fast execution may save between 25% and 40% in execution times, according to IBM estimates.

Object space savings can range from 10% to 20%, if the object program size option is chosen.

A set of subroutines, the PL/1 Resident Library, is required during the link-editing of a compiler output module. Another set of subroutines, the PL/1 Transient Library, is required for execution of the object program.

Monthly charges for the compiler and the two libraries, under either OS or DOS will be about \$250. With the new program products, the potential of PL/1 apparently will come closer to reality, but at a significant cost.

Standard Compilers Mean Flexibility

(Continued from Page S/3)

language elements required by the standard. In some cases, entire new functions have been added to bring the compiler closer to full standard Cobol (the highest levels of all the modules).

Despite the order implied by the chart, none of the vendor's Cobol reference manuals display a solely standard implementation. The standard is there alright, but it is surrounded by numerous Cobol elements that are not standard.

These elements, called extensions, are found in every Cobol implementation. They are legitimate in the eyes of the standard, and are included for a variety of reasons.

Some elements are left over from the preceding version of the compiler, since the process of compiler extension to meet the standard was seldom matched by a corresponding deletion of existing nonstandard elements, except where they were in conflict with the standard.

Others, such as the interprogram communication feature, are new Cobol elements that have not yet been exposed to the standardization process and

are included by the vendor in anticipation of that event.

The majority, however, are inventions of the vendor that enable him to make his implementation more effective with respect to his particular computer and related software.

The majority of these extensions will have some impact on program transferability; major extensions like non-standard random access methods may cause major rewriting if a transfer to a different vendor's compiler is made.

Once an extension has been identified, deciding whether to use it or not is another difficult problem that must be answered by each installation based on its plans and objectives.

Cobol users face some degree of conversion effort in order to utilize these new compilers. This effort may consist of simply teaching programmers the new features available, but more than likely, it will include program conversion.

The extent of such a conversion depends on several factors, among them the degree to which the user's present compiler deviates from the standard, the number of non-standard elements the programs contain, and how close to standard the user

wants the converted programs to be.

A greater effort now will result in more nearly standard programs that might never need to be converted again.

Implementors whose pre- and post-ANS compilers differ enough to require program conversion will probably provide help to their users in the form of a dialect translator. For example, IBM offers a language Conversion Program (LCP) that automatically converts a large portion of a Cobol D, E or F program to ANS Cobol, and flags those statements that require further attention.

These implementor aids will undoubtedly insert non-standard extensions into the converted programs, so if the user is aiming for a conversion to standard Cobol, he'll have to do a little extra work to remove the extensions. However, he can do this at his leisure since the converted program will run as is.

Harry T. Hicks is director of consulting services of Information Management Inc., and is a member of Ansi working group X3J4 (Cobol Standardization). Before joining IMI he held positions with Computer Usage and Boeing.

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User Can Run His Own Tests

Navy Audit Routines Show Flaws in Cobol Compilers

By Richard C. Fredette
Special to Computerworld

Cobol has attracted users in the last 10 years because of its reputed facility for providing relatively machine-independent programming. Perhaps more than any other single factor, costly second- to third-generation system conversions highlighted the need for applications software that could be readily exchanged between computer systems.

But if Cobol is intended to be machine-independent, the compilers must have the same features. Happily for the user, the Navy has developed a set of programs that are in effect audit routines to identify compiler shortcomings.

These routines are available to the compiler developer and, even more importantly, to the user for his own in-house testing.

Prior to the recent Cobol explosion, the most widely used programming languages for business data processing were the machine-oriented assembly languages. A primary disadvantage of these languages is that they often inexorably marry a user to a single computer system, making it costly for him to change or upgrade his current system.

Techniques of simulation and emulation offered by some vendors permit the programs of one machine to be operated directly on an otherwise incompatible machine. However, programs operating in these modes usually perform at slower speeds than do those programmed for the specific machine.

These methods may be satisfactory for short periods of time, but the loss of efficiency and high cost of operation can eventually become substantial.

Another conversion approach, often more satisfactory in the long run, is to recode or translate a user's programs into a language acceptable to the target machine.

The process of recoding and translating, however, is naturally a formidable one – and will be initially expensive and time consuming.

Greater Potential

By contrast, the Cobol user allegedly enjoys a greater potential for a relatively simple and inexpensive future system conversion. Since Cobol compilers are available for nearly all computers, a Cobol user should experience little difficulty recompiling his programs on another machine and proceeding as before.

Not so, however. Although Cobol has turned machine-independent software into a distinct possibility, that goal is only now on the way to being fully achieved.

One of the factors adversely affecting the portability of Cobol programs is that vendors sometimes implement certain features of the Cobol language in such a way that one compiler gives results inconsistent with another. Another problem arises when vendors selectively omit or include various elements of the language in their compilers.

In either case, there is no assurance that a Cobol program written for one machine can produce identical solutions on another machine.

Much of the blame can be laid to the specifications used for implementing Cobol compilers. In the past, Cobol compilers were implemented from specifications published periodically by the Conference on Data Systems Languages! (Codasyl). The latest specification for new Cobol implementations is the American National Standards Institute (Ansi) Cobol Standard X3.23-1968 prepared after refining and subsetting Codasyl's 1965 specifications.

Although the Ansi document provides a

tighter interpretation for the elements of Cobol, and defines several logical modules for common implementation, it does not in itself insure the development of compatible Cobol compilers.

The Ansi Cobol committee realized at the time it started to develop the Cobol standard that it must provide the user with some means of validating a vendor's compliance. Concurrent with the development of the standard, the committee undertook to develop a set of "audit routines," so that each element or statement from the standard could be selected, compiled and executed, giving a "pass" or "fail" indication, as appropriate, for each Cobol feature.

Only One Interpretation

The routines were to accept only one

interpretation of a Cobol element or statement, in accordance with the standard, insuring that all Cobol programs would yield identical results, regardless of the compiler or computer on which it was to be run. The audit routines were also to provide positive identification of the standard Cobol features that were either present or missing in a given compiler.

The committee's intention was to make these routines available to the public simultaneously with the publication of the Cobol standard.

Anticipating an inability to produce audit routines in a reasonable amount of time, both the Navy and Air Force independently initiated projects in 1967 to develop such routines.

The Navy received the help of several vendors and other users and completed an

initial version of the audit routines in January 1968. Continued vendor and user cooperation had enabled the Navy to make significant improvements to its routines in subsequent years.

Currently, the Navy is consolidating the Air Force and the Navy audit routines into a single set for all DoD use. Upon completion of that job, the resultant audit routines will be offered to the Ansi Cobol committee for consideration for adoption by that body.

Richard Fredette, assistant head of the Navy programming languages section, Information Systems Division, Office of the Chief of Naval Operations, is currently responsible for the implementation of policy and standards for programming languages and other software for the Navy.

In the next few weeks

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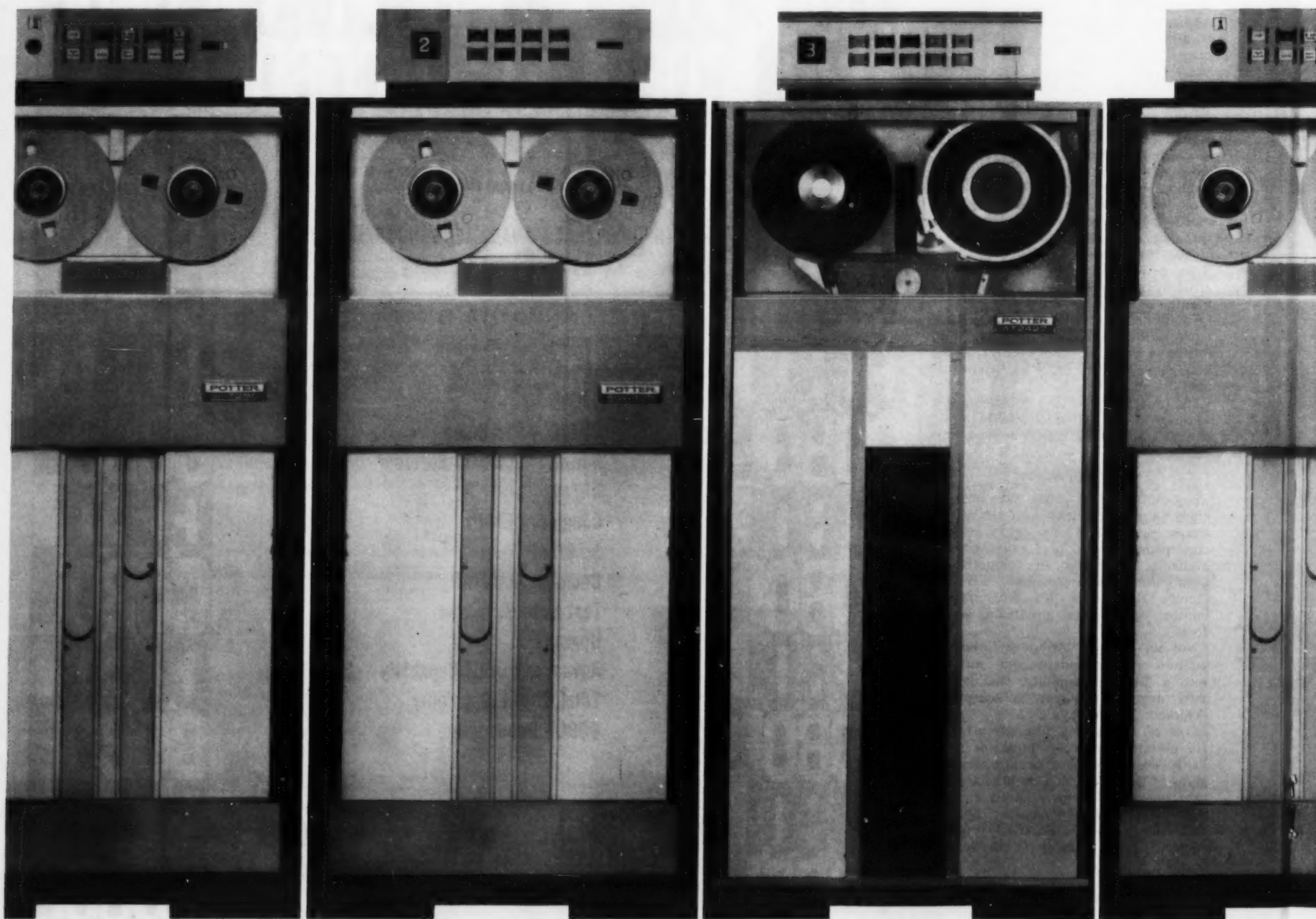
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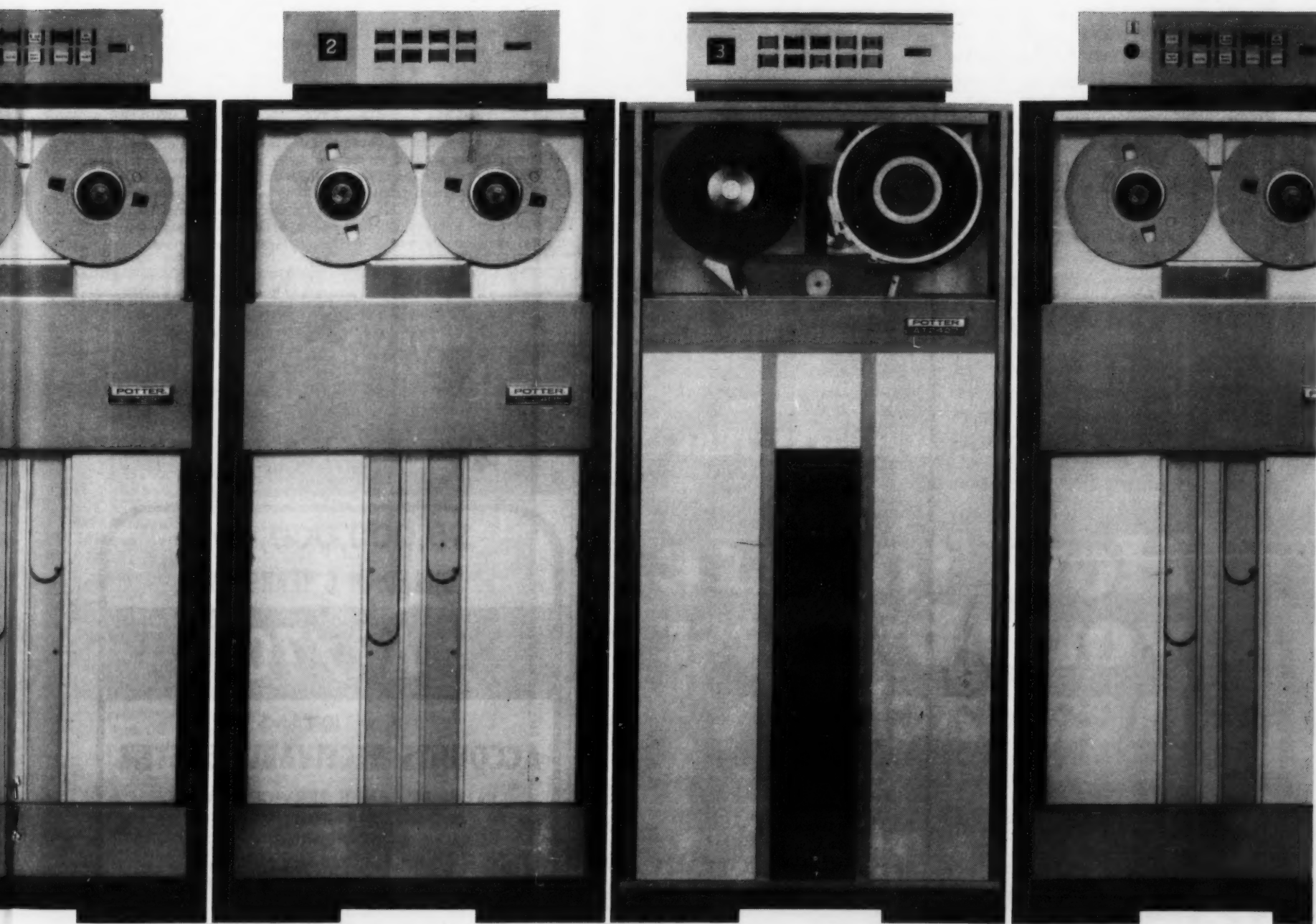


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Source Generators Build Full Cobol From Shorthand

By Don Leavitt

CW Staff Writer

Although the English language nature of Cobol makes program logic easy to follow, it also tends to make the coding wordy, repetitious, and burdensome to prepare. Now, however, there are several packages available to relieve the Cobol programmer of much of the routine effort.

About the only thing the packages have in common is that they produce complete Cobol statements in all divisions of a program from some sort of abbreviated code. Beyond that, they provide a diverse array of features, each geared to easing the programmers' work or extending the capabilities of the compilers themselves.

Although they simplify coding effort, source language gen-

erators are not intended for the non-programmer. They do not provide fixed program logic. The user must develop his own logic for each program, with an understanding of the computer's capabilities.

Most of the source language generators are implemented on, and produce Cobol for the 360, but several of them can be used on and for other processors.

Atlantic Software said it can provide versions of its "Shorthand Cobol" for the Univac 1106/08, Honeywell 200, Burroughs 3500/5500 and RCA Spectra 70, in addition to the IBM 360. An interactive generator, Coboltext, from the Matrix Corp., can be used for CDC 3000 or GE 600 series, or IBM 360, on the basis of a programmer entry early in the

process.

Two generators from Data Technology Inc. (DTI) are deliberately written in and produce a "low level" Cobol so that the packages themselves, and the source language they generate, can be used on a variety of processors.

MetaCobol, developed by Applied Data Research (ADR), is said to produce acceptable source code for IBM's Cobol E, F or ANS compilers. This package allows the programmer to define new verbs for use in his programs, and to create and use macro instructions or use ADR-supplied macros, in addition to coding many of the Cobol-required words or phrases in shortened notation.

Rather than language enhancements, Jobol from Computer

Usage Co. (CUC) couples system design capabilities with coding shorthand and system-generated I/O coding to produce source code for the 360. Jobol helps the programmer determine the optimum blocking factor for files, and the appropriate layouts for printed reports before coding is generated.

The Terminal Oriented Commercial Applications Programming (Tocap) system developed by DTI attacks a different problem. It is intended to make Cobol "conveniently available" to the time-sharing terminal user. It accepts shortened Cobol statements, free-form decision tables, library subroutines and source language debugging statements.

The decision table module is designed to accept limited, extended or mixed entry tables, and to produce Cobol coding covering every possibility expressed.

Debugging capabilities under Tocap include the insertion of trace and field-examination features.

Batch Operation

Another DTI package, Cobility, has features similar to Tocap but operates in a batch mode. Cobility allows shorthand notation for required words or phrases and also lets the programmer use abbreviated data names, which are expanded into

full form at the source language level. Cobility does not include the decision table capability.

The Matrix Coboltext generator also allows abbreviated data names which are expanded to full form, but rather than using mnemonics the Coboltext programmer uses a uniquely assigned "index number" for each data name referenced in his coding.

Atlantic's "Shorthand-Cobol" includes macro capabilities that can be used "as is" or modified by the user. It includes a table of abbreviations which the user can also expand dynamically to include words or phrases unique to a given application.

As with several of the other generators, "Shorthand-Cobol" also allows the user to intermix standard Cobol coding with the abbreviated forms permitted by the package.

Editor's Note

The software supplement has been edited by CW Staff Writer Don Leavitt, who has been responsible for the software/services section of the newspaper since last March.

Leavitt entered data processing in 1962 as a programmer for a major utility. Since then he has worked as a programmer, systems analyst and consultant in banking, manufacturing and service bureau environments.

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Broker Outlines Checkpoints

Careful Planning Is Key to Effective Package Use

To help users appreciate the work they should be prepared to put into finding packaged software suitable for their purposes, CW recently discussed the situation with Ted Beam, president of Computer Software Exchange Center, Kansas City. As a software broker, Beam is in a position to understand the problems of both the buyer and the seller.

Q. What are the advantages of purchasing software through a broker, or directly from a company that originated the software?

A. Even if program alterations are required, most purchased programs can be operational in a fraction of the time that would be required to develop them from scratch.

Plus, the purchase cost generally is less than 25%, and sometimes as little as 5%, of the development cost.

Q. What are the disadvantages?

A. Assuming that the software is adequately documented and that it can be purchased from a company with the resources to provide satisfactory technical support, the user is faced with the problem of making any alterations necessary to convert the purchased program to his own uses.

This will sometimes be as simple as changing the I/O formats or changing channel assignments.

On the other hand, it may be necessary to completely reorganize data bases, alter operating systems, purchase additional peripheral devices or create an entirely new subroutine library.

Q. It sounds like these problems could be monumental. How can a user avoid having these problems with purchased software?

A. This is going to sound very basic, but the one biggest reason for problems is lack of adequate "prepurchase" planning.

Q. Why is this such a problem?

A. Frequent hardware advances and heavy production schedules make it virtually impossible for DP managers to make accurate, long-range software plans.

So they are forced to adopt a "let's get something into production" attitude towards software. This tendency, plus the lack of established guidelines, has presented users with significant and unexpected installation problems.

Q. Can you tell us more about the type of planning necessary to avoid these problems?

A. Two main areas should be considered. The first is — major operational factors related to the in-house hardware, personnel, and time requirements.

And the second area includes all package specifications related to hardware, problem description, design, program, input, output, and operation.

Q. What do you mean by major operational factors?

A. All in-house functions and departments affected by the use of the package. A date for the package to be in production must be established, meeting the combined schedules of DP and the requesting department.

Based on this time frame, availability of present personnel to be assigned to the project without impairing standard production schedules must be determined.

If the in-house staff is not sufficient, funds must be allocated for hiring additional personnel. Necessary machine time for the package debugging and production requirements must be allocated.

Q. And what should be examined for the package specifications?

A. A complete explanation of each item would take more time than we have today. But briefly, the users should be aware of hardware and operating system

limitations, as well as any logical restrictions or limitations of the application as it is packaged. I/O specifications, including possible sources for required information, must be considered, along with the expected mode and frequency of operation.

Q. Once the prepurchase planning has been completed, how would a potential user go about finding the software that fits his requirements?

A. If a user decides to search for the software himself, he must be prepared to devote a great deal of time to the search.

Most potential users begin their software search by examining the various listings that are available. And, of course, a lot of software may be found in the want ad section of industry publications.

Q. After a promising software package

has been located, what is the best way for a prospective user to evaluate it?

A. As far as I am concerned, the best way is for the purchasing user to run the software package — before purchase — on his own computer under his own operating system. Of course, this involves some expense in the development of test data and the creation of test files.

However, it is an extremely effective way to test the documentation and to identify any program limitations. This on-site testing will also give the potential user greater insight into any difficulties that may be encountered in the implementation of the system after purchase.

Q. Speaking of implementation, we often hear that it costs many times more to implement a system than to purchase it in the first place. Do you find this to be

true generally?

A. This condition will exist in two instances. The first occurs when a purchasing user is not able to find a program closely allied with his needs and so he purchases one knowing that extensive modifications will be necessary.

The second instance is where the purchasing user does not adequately define his needs and established criteria for considering programs. Of course, without a clear picture of what is being sought, it is very difficult to select the most applicable software.

Here again, the secret of limiting or eliminating unexpected modification problems is careful preplanning. This will make it possible for the purchasing user to determine the type and extent of modifications that will be necessary.

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More Flexible Multiprogramming

Packages Store DOS Programs in Relocatable Form

By Don Leavitt
CW Staff Writer

While DOS/360 is intended to supervise multiprogramming operations with up to three partitions for separate programs, users have found that the IBM system does not give much flexibility in using the partitions effectively.

fectively.

Several independent software houses now supply software support to make DOS more flexible.

DOS is economical in its core requirements and generally does an adequate job of coordinating the execution of the programs in the three partitions.

The rigidity in the system lies in the fixed sizes of the partitions during execution of any job stream, and the inability of the user to easily locate his program in any of the partitions he wishes.

Normally under DOS, a program is cataloged to a particular partition, and can't be run in either of the others without special effort.

Relocatability Problems

Until the most recent releases of DOS, relocatability of programs using tape files was particularly difficult, and effectively impossible, since tape units used by one partition were unavailable to the others.

DOS relocatability could be achieved either through special programming techniques in Assembler Language programs or by cataloging the program into each of the partitions in which it might run.

The first approach, using Reloc macro and other coding, is, as already noted, available only for BAL programs and has not been incorporated in the language processors for the higher lan-

guages, nor in the linkage editor.

The second method of achieving relocatability requires separate link-edits for each partition in which the program is to be run. In turn, these link-edits result in separate copies of the program being cataloged into the core-image library, and separate program names and job streams being needed to initiate program execution.

With separate link edits, the user runs the risk of failing to update all copies of the program when maintenance is required. Large amounts of disk storage space are required to hold these images in the library.

Independent Packages

Three independently developed software packages said to make DOS/360 application programs completely self-relocatable are:

- Dosrelo, available from Boothe Resources,
- Relocate, from Vendere, and
- Selfrelo, from Webster Computer Corp.

With any of these packages, only one copy of each application program is stored on the core-image library. The address formats carried in that copy are not limited to a single partition, but allow the program to be run in any of the partitions without further modification.

Although each of these packages accomplishes the same basic goal, (and costs about the same) each attacks the problem somewhat differently.

Dosrelo and Relocate are effectively free-standing programs that work closely with, but are not modifications of, the DOS supervisor or linkage editor coding.

Selfrelo does add coding to the supervisor and produces self-relocatable programs automatically rather than through a separate step in the compilation/link-edit process.

Boothe's Dosrelo requires 24K to 26K core and a separate set of JCL statements per program. The program is used between the assembly/compilation step and link-editing. Dosrelo reads the object code generated by any of the standard language processors, and produces an additional card set which is combined with the object deck for link-editing.

Vendere's Relocate makes two requirements of each link-edit: the modification of the phase card to the self-relocating form, and the addition of one card to initiate the Relocate operation immediately prior to executing the linkage editor. Changing partition sizes, and hence beginning addresses, does not require re-link-editing.

Webster's Selfrelo provides complete relocatability for Cobol, Assembler, Fortran, PL/I and RPG object programs, as do the other packages.

Relocation is automatically accomplished through a control card option during "Catal" function.

Each of the packages appears to successfully support relocation of overlays, phases with Common reference, root phases and multitasking.

Situations in which overlays CALL overlays can, however, cause problems and take some serious programming effort, with any of the packages.

While the Webster approach of adding coding directly to the DOS supervisor may make that package more efficient than the others, it may also cause some confusion in the event of program problems.

In order to distinguish between problems caused by IBM-supplied coding and Webster-supplied coding, the user would be well advised to maintain copies of the supervisor, both with and without the Selfrelo logic.

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Contracts, Services, Packages Aid Transferability

By Don Leavitt
CW Staff Writer

In spite of the soothing tones of manufacturers' announcements telling of "evolutionary" new systems, transferability of applications and programs from one system to another and language conversions are still serious problems for many users.

Users who move from one manufacturer's hardware to another's must be aware of what they face in terms of necessary conversion or rewriting.

Even users who stay with a manufacturer may face problems. For example, moving to the 370 from the 360, a user can still use all the programs that ran on the 360, including old 1401 programs under emulation. But to get the most efficiency from the system, and to protect himself in case program maintenance is required, the user probably should convert the Autocoder programs.

Conversion Problems

Even without changing equipment, the user may face conversion problems brought on by the manufacturer's decision to drop support for a particular language processor. The users of IBM's Cobol F have this problem now.

Transferability can also be a problem to the user who finds a program or entire

application that is "exactly" what he needs, but implemented on an incompatible processor.

If there are problems, there are also solutions. RCA's guaranteed software conversion contract should take the pressure off any 360 user moving to the new RCA systems.

The user who wants to upgrade his programs from second generation can call upon various "translation" services, or he can use any of several conversion packages on his own in-house equipment.

The services themselves generally use computer programs to perform the conversions, and claim anywhere from 70%

to 90% effective transformation with the mechanical approach alone.

The transformation effectiveness in-house or by service is adversely affected by instruction sequences that are perfectly acceptable to the old language, but which cannot be "understood" by the

(Continued on Page S/14)

Buying Packaged Data Management Seems Best

By Peter L. Briggs
Special to Computerworld

One particular type of packaged software, information storage and retrieval systems, is still attracting interest from many different users. There are several problems in using such systems and in obtaining them from outside sources, but these problems are far less than the problems of in-house development, for the majority of potential users.

To develop a data management system of any complexity, the user must hire a small staff of specialists.

A group of four is about minimum and these four specialists are probably worth about \$18,000 each on an annual basis. Taking overhead into account, the group will probably cost the company about \$125,000 per year in salaries, benefits, space, management time, etc.

A typical information storage and re-

trieval system requires about two years to develop and to install.

Two software firms that have been through the process found that in one case it required about 500 hours and in the other, about 800 hours of machine time for development and debugging.

In both cases the work was done on a fully multiprogrammed 360/50 with an approximate rental of \$20,000/mo, thus costing the company about \$5,000/mo for the development work.

If the average of 650-hour total were divided into eight-hour shifts, it would amount to nearly four calendar months at \$5,000/mo or \$20,000 for the project.

Overall Cost

If these figures are reasonable, and both the software companies interviewed admit that they seem so, then the average general-purpose information storage and

retrieval system costs at least \$270,000 to develop and install.

The most obvious alternative approach, for the IBM user, would be to lease the basic software, probably Version I of Information Management System/360 at \$500/mo, from IBM and hire a systems analyst to alter the system to fit the user's requirements. One user who followed this route told CW that it took about a year to handle the alterations: this would make personnel costs about \$33,000.

Machine time for the alterations ran to about 200 hours and cost the user about \$9,000 on a 360/40. Total fixed costs, before the system was useful, then ran about \$49,200, including the one-year lease cost of the software.

The other principal alternative would be to purchase, or lease, the software from

(Continued on Page S/12)

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Mini Users Benefit Most

Cross-Assemblers Promise Speed, More Features

By Don Leavitt
CW Staff Writer

Minicomputer users have a rash of available cross-machine assembler packages that use varying combinations of host-and-target, or source-and-object machines. Most of these packages allow programs, designed for a minicomputer, to be assembled, and often debugged, on a larger general-purpose mainframe.

At least two cross-machine assemblers provide even more flexibility than the others. In theory, Compata's Bias allows the assembly of programs for any machine (mini or full scale) on any machine that supports ANS Fortran. Interfaces have to be developed for each new target or object machine to be served by Bias.

Proprietary Software's Dual package provides double flexibility. With Dual's

meta-compiler capabilities, the user can create his own language and then modify it dynamically, if he wishes, during the assembly of a program.

Beyond that, Dual may include various modular "object converters," which generate object code for particular machines. A user, then, can write a program in his own language and have it run on any machine or machines of his choice.

These are perhaps typical of the mini-on-mainframe packages:

- Novasm and Nomac, from Comptek Research, Buffalo, N.Y., provide for the assembly and operation of Nova/Superova programs on a 360 or on a DEC PDP-10.

- ATI-16, from Automated Technology, provides assembly of Honeywell CCD 16-bit machine programs on a 360.

- Interactive Minicomputer Programming (IMP) service, from Applied Data Research, assembles Nova programs on a PDP-10, in time-sharing mode.

- Programs from the DEC users group are geared to having PDP-11 programs on the PDP-10.

Users can consider the assembling and testing of minicomputer programs on larger machines for any of several reasons, according to the developers.

The mainframes generally have better and faster I/O capabilities than the minis, and with larger memories available, the assemblers can be more efficient than they would be on the restricted mini memory.

Again because of the larger memories, the cross-machine assemblers can often provide macro and other capabilities that

simply could not be included on the minis.

Finally, the developers note, going to another machine for program development work leaves the mini free for full-time production.

I/O Capabilities

The biggest advantage of any of the cross-assemblers would seem to lie in the better I/O capabilities available on the mainframes.

While many of the minis have reasonably good language processors, the assembly process takes vast amounts of time when geared to the typical paper tape or keyboard input and paper tape or teletypewriter output. The ability to input at card reader speed and output at card punch and line printer speed would obviously improve the process.

In some cases, the user might even go one step further and put his input on magnetic tape to get more speed.

Although the assemblers generally available from the mini manufacturers include many of the conventional step-by-step operations of data movement, mathematics and logical decision making, there are few, if any, higher-level language elements.

Processing of macro instructions, in which a number of lines of object code are generated from a single line of source code, requires more storage capacity for the processor than is available on most minis.

The cross-assemblers, with access to the larger mainframes, often include just such features as macro instructions.

Paradoxically, a cross-machine assembler that has macro capabilities puts a very specific constraint on the user even while providing higher-level language freedom.

The user must have access to the proper host machine as often as he needs to perform maintenance on the application program using the macros. The original assembler on the object machine cannot expand the macro into the string of instructions as the cross-assembler can.

Buying Package May Be Best Method For DMS Installation

(Continued from Page S/11)

an outside software firm. Such packages can be purchased at prices ranging from about \$17,000 to nearly \$100,000, each with different features and different machine requirements. It would be likely that the user would have to pay between \$20,000 and \$25,000 for a package similar to the one supplied from IBM. Should the user choose to lease the package, he would be paying between \$1,000 and \$2,500/mo, depending on the terms of the lease.

Where the user develops his own system, he must plan on spending at least \$270,000 and waiting two years for the system.

For the next-best plan, where IBM supplies the package, the user can expect to expend \$49,200 and wait one year for operation.

In the case of the IBM software, there is an additional ongoing expense of \$7,200/yr for leasing the software, once the system is operational.

For the best plan assuming moderate prices, where the software and alterations are supplied by the independent software firm, the costs also run about \$50,000 but the waiting time before installation is reduced to about six months.

Peter Briggs is an independent consultant specializing in data processing.

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Packages Can Report Effectiveness of User Programs

By Don Leavitt
CW Staff Writer

Users ought to be more concerned with the effectiveness of their programs. The language assembly systems they are using force them to consider the validity of their coding. Attempted executions, assuming good test data, highlight any flaws in the program logic.

But many installations use nothing more than manual desk-checking to sharpen the operation of the programs, even though there are software packages available that could help in this effort.

Several hardware manufacturers include computer component usage accounting as part of their operating systems. From IBM's OS/360 or Univac's Exec 8, for

example, a user can determine how much of total execution time is spent in the wait state, in processing, disk accesses or tape reading.

But these are gross statistics and do not show what specific parts of a given program are taking disproportionate amounts of time.

Alternatives

What alternatives does a user have? Theoretically, he might be able to develop his own program to monitor the operation of other programs, but realistically this approach is open only to the most skilled staffs.

It requires accessing, recording, and reporting systems data that is not normally used or even available to the user.

The monitoring-reporting functions have to be so well designed that they add an absolute minimum of overhead to the systems load.

OS/360 users apparently are the only ones who can now get packages support

from independent vendors or mainframe manufacturers, although similar evaluation packages are said to be presently under development at RCA.

Problem Program Efficiency (PPE) programs, and Lambda Efficiency Analysis Program (Leap) are available respectively from Boole & Babbage and from Lambda Corp.

A more modest package, called Proglook, is also available — from the Cosmic software clearinghouse at the University of Georgia.

The packages are similar in that they report the results of periodic monitoring of various systems signals in the form of histograms and supplementary printouts. These are produced by a data reduction program run after the completion of the job stream being monitored.

Divergent Approaches

Despite their overall similarity, the packages clearly show divergent approaches as to how software measure-

ment data should be made and/or reported.

PPE and Proglook each give the user the option of defining the frequency of the sampling. Leap, on the other hand, sets its own frequency dynamically, increasing the sampling when the program is spending a great deal of time in a given area of core, and cutting back in the less heavily used portions.

This means, according to Lambda, that the user automatically gets a sharper focus on the parts of the program that are time-consuming.

All three packages can operate under OS/MVT, but that is the limit of the Proglook capabilities. Leap can also function under MFT environment, while PPE can be adapted to any of the OS options, according to Boole & Babbage.

Leap costs \$8,500 and PPE \$8,800. The Proglook package, developed at Stanford Linear Acceleration Center, is available from Cosmic for \$275, with documentation an additional \$3.50.

Monitors Gauge CPU Utilization

It was once said that a good programmer didn't have to know what was actually happening inside the CPU, any more than a good driver necessarily had to know what was happening inside the carburetor.

Now, as systems become more sophisticated and systems elements often operate independently of each other, in multiprogramming mode, for example, the user has to be aware of the interplay of the elements. Various measurement aids are available to help the user in his understanding of how effectively his system is functioning.

Hardware monitors are quite literally "black boxes" including needles or probes that can be attached to various parts of the computer. The probes measure the presence or absence of electronic signals and the resulting information is recorded, generally on magnetic tape.

Later it is organized, reduced, and analyzed by a subsidiary software program that produces printed reports.

Most of the hardware monitors are geared to measuring such elements as central processor utilization, the execution activity of all channels, and devices during program runs. Reports showing head movement between disk cylinders could help the user optimize his volume organization, thus clearing throughput bottlenecks.

Monitor Variation

Still another variation on the hardware monitor is a software package that measures the operating speed of various peripheral devices, compares the measured speeds to manufacturers' specifications, and reports the devices' variations from the norms.

While this is basically intended to help the user maintain his current equipment at optimum operating effectiveness, it could be used to compare peripherals from competing manufacturers. An independent vendor's disk drive that is said to be plug-to-plug compatible with IBM's 2314 could be tested on site so that the user would know which unit actually performed better.

Other products are, in effect, "pseudo-hardware" monitors. These are software programs that allow the user to simulate proposed hardware changes, and determine what effect they might have on his operations.

The effectiveness of the simulators clearly depends on the accuracy of the processor or peripheral "model" being used. Although some of the vendors offer a complete library of "models," the user familiar with simulation techniques could build his own library with any of the general-purpose simulation languages available. If the user isn't knowledgeable in simulation techniques, it seems likely that even the packages geared to hardware simulation wouldn't do him much good.

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FORCE inventors Fred Jones, Bert Kulic, and Gene McMahon, are on the right. The guy on the left is Alan Goldberg. He came up with the quarter of a million dollars.

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Multiprocessing Monitors 'Multithread' Messages

By Don Leavitt
CW Staff Writer

Users who want to improve the efficiency of on-line applications operating in a multiprogramming environment can do so with the monitor systems/access method packages from various vendors.

At least one of these packages, Task/Master, can be implemented on "any" operating system, according to the developer, Turnkey Systems Inc. Most of the other systems, however, are intended for use only on the 360 under DOS or OS.

Core Utilization

The Environ/1 operating system appears very efficient in terms of core utilization. The system allows most 360 real-time applications to be processed in a CPU and core configuration one size smaller than would be needed otherwise.

For example, the developer, Information Storage Systems, said that an installation that presently requires a 512K

360/50 can produce the same job throughput on a 256K 360/40, using Environ/1.

In addition to saving core, Environ/1 also outstrips conventional single-thread and multithread message-handling systems in response time, the company said, and the improvement increases as the system nears capacity.

The current version of Environ/1 has been implemented under DOS/360 and is said to support up to 30 terminals, with an average rate of one transaction/sec, on a 32K 360.

ISS Package

The ISS package apparently gains much of its effectiveness from a proprietary Compressed Indexed Sequential Access Method (Cisam) that is an integral part of the package. With tighter record formatting, Cisam moves data faster than IBM's Isam permits.

A two-part access method/on-line moni-

tor system that also claims significant core savings and faster message processing through multithreading is the Amigos/Hyper-Faster system from Compress.

The Amigos portion of the package is similar to ISS's Cisam in that it is intended to replace IBM's Isam.

The Hyper-Faster portion of the Compress system is intended to enhance the Faster monitor system available from IBM. The Compress modifications to the IBM coding may permit the processing of 10 transactions concurrently, compared to one-at-a-time processing under the original Faster logic.

As an option for the Hyper-Faster user, Compress said that it can support IBM 2260 local terminals under OS/360.

Undoubtedly the most spectacular monitor system available from a non-hardware manufacturer is the National CSS package for a 360/67, in single-processor or duplex mode. Developed for use on the National CSS time-sharing network,

VP/CSS has been packaged by the company for user's in-house installations.

Another monitor system based on the Faster package, Multi-Faster from Systems Dynamics Inc., replaces the IBM coding rather than supplementing it. Multi-Faster utilizes re-entrant forms of the Faster subroutines to reduce core requirements while still supporting multiple users concurrently.

Three major features distinguish Multi-Faster from the earlier Faster: separate tasking of line or network control; priority message scheduling; and the multithreading of message processing.

Automatic Reassignment

Although each application and each terminal has an automatically assigned priority level, Multi-Faster provides equally automatic reassignment to higher priority of any low-valued messages that are otherwise being bypassed.

Multi-Faster is available in versions for DOS, OS/MVT, and OS/MFT II operations. IBM's Basic Telecommunications Access Method (Btam) is used to support the terminals and Isam files are accessed via Bisam and Qisam control.

Users of the Intercomm monitor system from Programming Methods Inc. seemed particularly impressed with the system's data collection and dispatcher capabilities that control the handling of messages and the loading/unloading of the application programs as required.

Turnkey System's Task/Master provides basic communications support including terminal initialization, message switching, assignment of priority of response by application, error recovery and overlay control.

Task/Master differs from the other monitor systems in that it is not limited to IBM equipment. It can function under any operating system, the company said, as long as it provides standard compiler and linkage support, and has one or more direct access devices.

The Task/Master monitor system also differs from some of the other systems in that it supports both batch and conversational modes of operation.

Some Solutions Exist For Transferability

(Continued from Page S/11)

translator package.

The choice of service or package to upgrade 1401 programs probably has to be based on the number of programs to be converted. The services generally charge on a "per card" basis, sometimes coupled with a "per program" charge as well.

IBM told its Cobol F users that support for that compiler would be dropped two years after the introduction of the ANS Cobol. To stay in Cobol, users have to convert the newer compiler.

In this case, however, IBM is providing, without cost, language conversion programs that will take the bulk of the conversion chore from the user.

Transferability between incompatible systems will become easy if the concept behind the Polypac cross-language processor can be fully developed. Theoretically, Polypac will be able to accept as input a source program in any language, and transform it into a source program in any other language, at the user's option.

Unfortunately for the average user the only input module thus far available is for the Adpac language, though output modules have been developed for ANS Cobol, RCA Spectra 70 Cobol and an assembler language for a minicomputer.

The choice of Adpac as the initial input module is natural enough since the developer of Polypac is Adpac Computing Languages Inc.

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Texas Studying TB Control System

AUSTIN, Texas — As part of a pilot study designed to determine the feasibility of a statewide tuberculosis control system, a computer initially is handling inpatient accounting information from the State Tuberculosis Hospital in San Antonio, almost 100 miles away.

"Our goal is to develop a complete TB management information system covering everything from hospital inventory control to laboratory reporting," said State Health Commissioner Dr. J.E. Peavy.

Through a remote communications terminal at the hospital, patient billing data will be transmitted to a Spectra 70/45 for daily file updating, permitting the hospital to retrieve computer-stored billing records almost instantaneously.

If the pilot study proves encouraging, two other state tuberculosis hospitals will be brought into the network that eventually would link 12 regional centers to

the RCA computer.

When a person enters a regional center for examination, the computer files will be searched automatically to determine whether he had been treated previously for TB.

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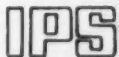
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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTER INDUSTRY

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CI Notes

Hypertech Likes Terminals

HARWOOD HEIGHTS, Ill. — Hypertech Corp. is finding happiness in the Viatron-like terminal market. One of the firms to enter the key-to-cassette data entry field after it was pioneered by Viatron, it is now reporting orders. Hypertech is installing systems at Inland Steel and American National Bank and has entered the overseas market through Case in Great Britain and Synalec in the Common market. Agreement with a Japanese firm is expected soon.

...And Moves vs. Viatron

Hypertech may also be moving against Viatron's stronghold — New England Bell Telephone. The AT&T unit is reportedly pleased with an evaluation of Hypertech's GTU-1. Sources say it will not buy the units unless Viatron goes "down the tube," since New England Bell is already committed there.

Calcomp Plotters 370-Compatible

ANAHEIM, Calif. — It's not surprising that IBM systems design and development division has demonstrated the compatibility of Calcomp plotting systems with IBM's new 370/155. IBM sells the Calcomp plotters on an OEM basis.

Raytheon Still in Display Race

WASHINGTON, D.C. — The Federal Aviation Administration has awarded a contract for up to \$463,438 to the equipment division of Raytheon for installation and checkout of a computer display channel and associated radar displays for FAA's National Aviation Facilities Experimental Center.

Ferroxcube Forms New Unit

SAUGERTIES, N.Y. — The formation of a new memory products division has been announced by Ferroxcube Corp. The systems division, formerly in Denver, Colo., and the computer components division have been combined.

Supershorts

RCA has won a contract to provide the U.S. Army, Pacific, with seven Spectra 70 computer systems having a sales value of \$11.7 million. The contract also includes an option for an additional 14 Spectra computers, which could raise the equipment value to \$30 million.

Codex Corp. has delivered high-speed data communications terminals to Air France. The units combine multiple high-speed reservations traffic paths between Paris and several North American cities into a 9,600 bit/sec operation through a single transatlantic cable voice channel.

A research project aimed at helping American companies improve their pricing policies and strategies for marketing computer products in Europe is being prepared by International Data Corp., Newton, Mass.

Exhibitors Few But 'Serious'

Designer Show Brightens OEM Market

By Phyllis Huggins

CW West Coast Bureau

ANAHEIM, Calif. — A highly respectable entry into the field of computer conferences made its debut here last week, with an estimated attendance of 5,000.

The Computer Designer's Conference and Exhibition pinpointed its interest directly at the OEM market and exhibitors and attendees gave it a vote of confidence.

Louis Feldner, On-Line Computer Corp., Stanford, Conn., said: "The conference reflects the economic climate. There aren't many kids here. We're all tough, seasoned people and we're serious about our business. The people coming into the booths are also serious. It's a good show."

He lauded the conference management for the professional quality of its planning and the support it gave the exhibitors.

Milton Kiver, conference chairman, said that there were surprisingly few cancellations by exhibitors and although it was a small show, just over 100 exhibitors, management was pleased with it and plans two such conferences a year starting in 1972. The western one will be held in Anaheim and the eastern one in Boston. A European conference will be scheduled in the future.

Largest draw of the technical sessions was one on "Minicomputer Architecture and Design," chaired by Don Pritchard, Data Systems Engineering Inc., Santa Ana, Calif. Popularity of this session was credited to the fact that in the general Anaheim area there are more minicomputer companies than in the rest of the country as a whole.

The special seminars covered the subjects of implementation of multiprocessors, chaired by James E. Feeley, CDC; aerospace computer requirements and developments, chaired by Gwen Hays, Westinghouse Electric Corp., and selecting mainframe memories, chaired by Stephen A. Thompson, the *Electronic Engineer Magazine*.

Proceedings cost \$19.50 and may be obtained from Industrial & Scientific Conference Management, Inc., 222 West Adams St., Chicago, Ill. 60606.

A cross-section of the exhibits shows the scope of the show. Datapac, Inc. exhibited a line of advanced memory systems including alterable U-core ROMs and bipolar RAM and ROM systems. USM Corp.'s Electronic Control Group displayed a variety of actuation elements, motors and sensors, designed to serve as key components in motion control and positioning systems for computer peripheral applications.

A new line of one-piece, all-nylon cable ties was introduced by Panduit Corp. Superior Electric Co. showed its new Slo-Syn photoelectric tape readers which combine photoelectric design with direct stepper-motor sprocket drives.

The electronic tube division of GTE Sylvania Inc. dedicated its booth to CRT devices and special products that demonstrated a variety of cathode ray and special-purpose tubes for computer ter-

minial and readout display equipment.

At the conference, Bert Forbes of Hewlett-Packard called for a better definition of computer architecture to help communications between the computer designer and the computer user.

Forbes said that fuzzy concepts of architecture were now causing a serious lack of communication and stated that architecture should be redefined to include the whole computer system.

Whole System

Under his definition, the whole system would include not just the central processor and not just the hardware, but hardware, software and whatever other devices are connected to the systems in a practical application.

In control computers, Forbes said that hardware specifications such as cycle time, DMA transfer rates, and interrupt response times are the most important, because the computer is essentially a component. As systems become more complex, these become less of a factor, he added.

"Each individual specification cannot be set up," he said, "and examined alone as though it were the deciding factor in designing or purchasing a real-time system, but must be taken as part of the whole."

"One hopes that both designer and users

will go beyond the traditional and parochial evaluation of a potential system, joining me in a plea for sanity in those who conceive the specs, those who write the specs, those who read the specs, and those who analyze the specs in terms of the requirements of the overall system."

In addition, an experimental computer-aided logic packaging and partitioning technique developed to provide computer designers a tool for partitioning of logic packages used in computer systems was outlined by R.J. Giannuzzi, C.S. Gurski and J.H. Stevens of the IBM systems development division laboratory in Endicott, N.Y.

The criteria used in attempting to optimize this process are found to vary with the system, technology, and designer's objectives. According to Giannuzzi, "The lack of a clear, universal set of criteria for optimizing partitioning has retarded success in development of a universal automated partitioning system."

The major components of the new system are a readily accessible file to store a block graph description of the logic to be partitioned, mechanism for assembling logic blocks into partitions, automatic testing of partitions generated against designer specified constraints, display facilities to provide feedback, and a means of storing and retrieving partition results as well as hard-copy printout.

Bombay Welcomes New 1401s

By D.L. Ernst

CW Bombay Correspondent

BOMBAY, India — Want a brand new 1401 or 1410 computer from IBM instead of the used versions being peddled in the U.S.? Take hope, they do exist.

This formerly sleepy outpost of the British Empire has been turned into the worldwide center for the manufacture of the IBM 1401 and 1410 CPUs.

This is presently the only place in the world that the systems are being built new. The key role of the Bombay operation is highlighted by the fact that a spokesman for the IBM data processing division in White Plains, N.Y., told CW that the last new 1401 was built in July of 1965.

But the worldwide leader in computers is not resting on its laurels,

however, and has applied to the Indian Government for permission to begin manufacture of System 360s here.

According to a spokesman for IBM, quoted by the *Bombay Financial Express*, the 360 is the firm's latest computer and "several computers in the series [are] on order in the U.S. and elsewhere in the world."

The *Financial Express* points out that the "latest technology used in this computer enables it to type, tape, print, punch, draw, photograph, or answer a telephone for solution of a multitude of problems."

According to industry sources interviewed by this correspondent, the less developed countries don't want older equipment, but want the most recent technology available.

With its 1401 plant here IBM is certainly giving it to them.

RCA Realignment Its IS Operations

CHERRY HILL, N.J. — RCA has realigned its information systems operations and industry sources expect the firm to announce shortly a major push into the overseas marketplace.

The realignment comes shortly after the elevation of former IBMer, L.E. Donegan Jr., to the position of vice-president and general manager for computer systems.

The speculation of a foreign push for the firm comes at a time when RCA operations are relatively weak overseas while other computer manufacturers are grabbing a large share of the overseas revenues.

At the same time, overseas operations for many of the other manufacturers are increasingly contributing to their profits.

The domestic realignment entails the consolidation of management, financial,

administrative and planning functions of the firm's information systems group and the formation of two divisions, a staff group and a manufacturing operation.

The newly structured organization will be called RCA Computer Systems and will consist of five operating divisions — data processing, systems development, graphic systems, memory products, and magnetic products. In addition, it will have a computer systems staff group and a systems manufacturing operations organization.

New management assignments in the Computer Systems organization include: Joseph W. Rooney, president of the data processing division; V. Orville Wright, president of the systems development division; and John R. Lenox, vice-president, systems manufacturing operations.

Correction

On page 45 of the Jan. 13 issue CW reported that the cost of the flux ring memory array from Signal Galaxies was 7 cent/bit. It should have read 0.7 cent/bit.

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Orders and Installations

Ampex Corp. has delivered a Model 3DM-2000 core memory system to the Indian Hill Laboratory of Bell Laboratories, Naperville, Ill.

The Electricity Supply Commission of South Africa, with headquarters in Johannesburg, has ordered a Control Data 6400 computer system, valued at \$3 million.

The Colorado Division of Employment has installed a Burroughs B 3500 computer system valued at \$470,000.

The Danish Postgiro has ordered a second large-scale OCR system and leased an input image microfilm system from Recognition Equipment Industri, Swedish subsidiary of Recognition Equipment Inc. The system is valued at \$751,000.

American Bank and Trust Co., Baton Rouge, La., has ordered a Burroughs B 3500 computer system valued at more than \$570,000.

The Fairview Hospitals of Minneapolis have ordered a Univac 9400.

European Organization for Nuclear Research (Cern) of Geneva, Switzerland, has ordered a Control Data CDC 7600, valued at \$9 million.

Corte dei Conti, the control and accounts agency within the Italian government, has ordered an OCR system from Recognition Equipment Italia, S.p.A., a subsidiary of Recognition Equipment Inc.

The University of Notre Dame has installed an IBM 360/50 valued at \$1.4 million to increase its research and teaching capability.

NCR Century 200 computer systems have been ordered by Yancey Brothers Co., Atlanta, Ga., and Data Technical Analysts, Honolulu, Hawaii.

Silja Line, Turku, Finland, has ordered two Univac 9400 computer systems, valued at \$1.2 million, from the Univac Division of Oy Sperry Rand AB Finland.

Honeywell Information Systems has announced the following orders and installations of computer systems by local governments: a Model 115 for Crawley, England; a Model 110 by the City of Pasadena, Texas; and a Model 120 by the City of Buena Ventura, Calif.

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The commencing salary will be by negotiation and will depend on previous experience. Applications in writing, giving full personal particulars and details of qualifications and experience, should be lodged with the Registrar, University of the Witwatersrand, Jan Smuts Avenue, Johannesburg, by not later than 15th February 1971.

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Seller's Viewpoint

Experienced Intermediary Aid Needed in Merger Talks

This second of two articles on "dos and don'ts" for merger-minded companies by W.T. Grimm, president of W.T. Grimm & Co., a merger specialist, covers a potential merger from the viewpoint of the seller.

From the seller's viewpoint, there are several considerations

for the merger-minded company:

Don't think every buyer is a bargain hunter — though many are. Maybe he needs you more than you need him.

Do be prepared to furnish a complete, concise account of the status, prospects and problems

of the business. At the proper time, take the buyer into your confidence and give him access to historical financial records as well as most recent statements.

Do consider what the buyer does not say — as well as what he does say.

In a merger, as distinct from a

cash sale, do recognize that you must evaluate the buyer as closely as he looks over the seller.

Cash sales are taxable. Mergers, properly set up, are tax free.

You will find that you don't know all the answers. Trying to structure a deal yourself may lead to costly mistakes. At the proper time you will need expert legal and accounting counsel.

Do make a rational self-appraisal of your sincerity in trying for an agreement.

Don't overprice your company. If you stay on, you have to live with a new owner to assure that he gets a realistic return on his investment.

Pricing a business and evaluating a merger are imprecise. Two companies in the same industry with equal earnings cannot be judged by hard and fast formulae. One company may have a heavy debt structure and its earnings may be largely the result of such leverage.

Nor will striking an average of price/earnings ratio for an industry suffice, because profit

margins vary from company to company. Moreover, what may be a minor factor for one seller can be a critical factor for another.

Too much concern is shown sometimes over the determination of price. Corporations are not static; audits are not investment appraisals; product-mix change; management capacity for innovations may change, and so may labor relationships, as well as competitive conditions.

Many merger projects get into the "meeting of minds" stage and then drop flat. Very often the reasons relate either to technical matters involved in the tax treatment of the merger or to management contracts. Sometimes the market price of the buyer's stock becomes the pivotal factor. Again and again such frustrations upset promising mergers.

All these factors point to the need for experienced intermediary assistance to keep negotiations on the track and achieve the proper objectives of both buyer and seller.

Ampex Test Tape Evaluates Performance Of Longitudinal-Head Magnetic Recorders

REDWOOD CITY, Calif. — A precision test tape which evaluates the performance of longitudinal-head magnetic tape recorders will be marketed by Ampex Corp. under a domestic and international marketing agreement between Ampex and R.L. Electronic Communications Co. Inc. (RLCO).

The tape is designed to measure tape speed and tension, head stack displacement error, jitter, time base error, drift and tape slippage, and contains uniformly spaced pulses which provide a precise standard used to calibrate tape recording and playback systems.

The manufacturing process employs the patented "sing-around method" in which recording of each signal by a fixed record head is triggered when a fixed-position reproduce head senses the previously recorded pulse.

The RLCO test tape is available in 1 in. or 1/2 in. wide formats on any thickness, length and quality of tape desired. The prices range from \$400 to \$1,300 per tape with 20 day delivery.

Electronic Memories Heralds Megamemory 1000

HAWTHORNE, Calif. — Electronic Memories' Megamemory 1000, a 2-wire 2-1/2D core memory system, has an access time of 850 nsec with a 1.5 μsec

cycle time. Storage capacities range from 32,768 words of from 32 to 160 bit/word up to 524,288 words of from 8 to 14 bit/word.

The Megamemory 1000 can be rack-mounted in a 19-in. or 24-in. EIA chassis or custom

New OEM Products

housed.

Electronic Memories is at 12612 Chadron Ave.

Micro Switch Keyboard Features 'N' Key Rollover

FREEMONT, Ill. — A keyboard combining MOS encoding and "N" key rollover has been designed by Micro Switch. The manufacturer said the 128-character, Hall-effect keyboard, designated the 61SW12-1, is available from stock.

The 61SW12-1 is encoded with the 7-bit Usascii code plus odd parity.

Power requirements for the 61SW12-1 are +5 Vdc and -12 Vdc. Data key outputs (positive logic) are +0.6 Vdc maximum 1.6 mA maximum for logic "O,"

and +2.55 Vdc minimum 0.12 mA maximum for logic "1."

Micro Switch, a division of Honeywell Inc., is at 11 W. Spring St.

Other New Products

Computer Microtechnology, Inc., is producing two new bipolar 1K-bit read-only memories: the CM 2800, organized 128 by 8 bit words, and the CM 2850, a 256 by 4 ROM.

Each features access speed of 50 nsec, with power of .4 mW/bit. The units are TTL and DTL compatible.

Prices in quantities of 25 are \$57 for CM 2800 and \$50 for CM 2850 from 611 Vaqueros, Sunnyvale, Calif.

A 256 by 1 MOS RAM which interfaces with DTL or TTL without pull-up or pull-down resistors has been developed by Unisem Corp., a subsidiary of United Aircraft Corp.

Fully bipolar compatible, the new RAM offers a parallel memory with below 1 nsec access time that draws power at 1 mW/bit.

Unisem Corp. can be reached at P.O. Box 11569, Philadelphia, Pa.



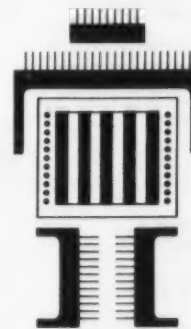
This portable terminal has a two character buffer that prevents it from falling behind when receiving data from a computer—puts an end to keyboard lockup and loss of information. There's nothing else like it, the Novar 5-41.

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 - What are the future trends in remote batch?
 - Keypunches – new life in an old medium.
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Our March 31st Memories Supplement

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- Which user sites can make best use of bulk memories?
 - Can independent suppliers continue to provide savings to computer users?
 - The trend to disks.
 - What can independents offer besides lower prices?
- Our *Independent Peripherals Memories Supplement* closes March 12. Reserve your advertising space by filling out the coupon below, or contact your local Computerworld representative.

Our April 28th Outputs Supplement

- will feature:
- Which users can make best use of COM (computer output microfilm)?
 - Can plotters have any applications to business?
 - Printers – impact vs. non-impact, speed vs. copies.
 - Is off-line output worth the cost?
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Nickels and Dimes

A group of New York investors have made a \$90,000 line of credit available to Computer Systems Technology of Jenkintown, Pa. The software house, organized in January 1969, had six-month sales of \$223,000 at the end of June.

\$\$\$

Control Data Corp. must be wishing that it could play follow the leader — IBM — in the profits column, but it's been sidetracked from the game by a bad fourth quarter. The firm said that losses from computer operations had dragged the firm, including the profitable Commercial Credit Corp., into the red in the last quarter. Earnings for 1970 should be well below \$1 per share, and probably as low as 50 cents per share.

\$\$\$

"A title on the door, rates a..." Not so at Cipher Data Products, which claims that it has turned the tide from a loss to a profit situation by reducing headcount 40% and not giving newly elected President Bill Otterson a thick carpet. The two-year old tape drive manufacturer claims that sales will hit \$2.5 million in 1971 up from around \$1.5 million in 1970.

\$\$\$

The Viatron debenture exchange offer flopped. While not disclosing any figures, Viatron spokesmen did say that not enough of the debentures were tendered and the exchange offer was withdrawn (85% acceptance was needed). The next move would seem to be up to the trustee for the debenture issue, the Old Colony Trust Co. of Boston. The terminal maker is still in default on the interest payments, and what happens next is a good question.

\$\$\$

Hopping down the money trail, Cogar has found a \$6 million egg left by an unnamed institutional investor, for which it swapped 120,000 of its common shares. Cogar said it would use the money for new product development, marketing activities, and — significantly — for lease capital.

\$\$\$

Cincinnati Milacron, the big machine toolmaker and one of the newest manufacturers of minicomputers, has projected wilting profits for the fourth quarter. It indicates that final period net will be less than the 33 cents a share of the third period.

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News Analysis

'Subtle' Price Change Thwarts 370 Lessors

By Michael Merritt
CW Staff Writer

The leasing companies are not buying 370s, that seems clear [CW, Jan. 20]. The subtlety of IBM's pricing change that contributed to the decision takes a little more effort to see.

The straight ratio of purchase price to monthly rental remains in the area of 48, where it always has been — more or less — for CPUs and memory.

This ratio is important because it determines the period of time a leasing company has to bet on keeping a computer in use.

But the straight ratio doesn't tell the whole story. Even though a user owns a computer, he still has to pay IBM to keep

its innards clean, and house-keeping for a 370 costs about six times as much as for a 360.

From the point of view of the leasing companies, it works this way: the purchase price of a 360/50 with 262K is \$633,190. IBM's monthly rent is \$14,165, and the monthly maintenance on the purchased machine is \$390.

Discount From Lessors

The third party lessors give a discount of about 18% under IBM prices, as a rule. This means that the lessee sees a bill for \$11,615. Out of this the lessor has to pay IBM maintenance, though, so he sees income of \$11,225/mo.

At this rate the lessor can pay off the machine in 56.4 months. It is a reasonable gamble that he can keep the machine on lease for more than four years and eight months, thus turning a profit for himself, as well as

computers anyway.

When IBM announced the new machines there was a massive sigh of relief in the leasing industry. By bringing out an interim machine, compatible with the 360, better than the 360 but not by orders of magnitude, IBM was protecting its own base of 360 equipment.

And incidentally this kept the chestnuts of the leasing companies out of the fire.

But a sigh of relief is a long way from a whoop of joy, and there haven't been any \$50 million orders from the leasing companies.

Because they can't find the money? Partially. But also because IBM likes to plot its own destiny, and is big enough to prevent anomalies, such as the third party leasing industry, from recurring.

Because there was a bulge of purchases from third-party lessors in 1968 and 1969, IBM's earnings rose faster than corporate plans called for.

Then, when the bulge went away, and the rentals weren't coming in from the purchased machines, the temporarily inflated earnings deflated.

IBM — or any other firm for that matter — wouldn't like to have to explain to shareholders a complex reason for sagging profits. But IBM can do something about it.

Financial

having a nominal residual value of 10% of the purchase price.

To take another popular configuration, a 370/155 with 262K sells for \$1,018,000, rents for \$21,500/mo., and costs \$2,450/mo to maintain.

(Maintenance for this 155 runs 11.4% of the rental, by the way, while it is only 2.8% for the 50.)

67 Months

Running the figures out, if the leasing companies are to keep the same 18% discount it takes them 67 months to pay for the machine. Five and a half years.

It was about five years from announcement of 360 to announcement of 370, and the 370 may well be an interim machine with an even shorter market life expectancy than the 360.

The lessors are thus faced with a much greater risk buying a 370 to lease than they were with the 360.

And most of them would have difficulty finding the capital they would need to buy the new

IBM Earnings Increase 9%, Top \$1 Billion Mark

ARMONK, N.Y. — IBM 1970 earnings topped the billion dollar mark for the first time. It was the 19th straight year of increased profits for the firm.

The earnings increase was sparked by the best quarter in IBM's history in the three months ended Dec. 31 and by foreign earnings of the IBM World Trade Corp. which topped domestic net income for the first time in the history of IBM.

After-tax earnings amounted to \$1,017,521,072 or \$8.92 per share on revenues of \$7.5 billion. In 1969, net income was \$933.9 million or \$8.21 per share on gross income of \$7.2 billion.

Overseas earnings amounted to \$512.5 million on income of \$2.9 billion. In 1969, when overseas earnings accounted for 42.5% of the firm's net income, foreign earnings were \$397.8 million.

Domestic earnings, however, tumbled to \$505 million, down from the \$536 million registered in 1969.

In the final quarter of 1970, net income amounted to \$275.2 million on revenues of almost \$2 billion.

Foreign Earnings

Foreign earnings, in fact, were solely responsible for the firm's continued increase in earnings, with domestic net income dropping around 5.8% in the year. The foreign earnings increased

28.8% in the period, giving the firm a total earnings gain of around 9% on the year.

Activities within World Trade Corp., however, accounted for only 39% of the total revenues of IBM — up only slightly from the 35% registered last year.

Thomas J. Watson Jr., IBM board chairman, noted that domestically "the condition of the economy affected our customers and, in turn, affected IBM."

"Data processing equipment previously installed with customers on a rental basis was discontinued at a higher rate than in 1969," he said.

Outright Sales

"But the substantially lower level of outright sales of computer products, previously reported, was the primary factor which contributed to a decline in domestic operations during 1970."

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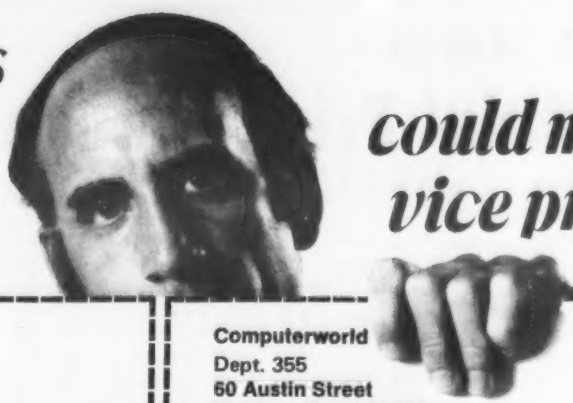
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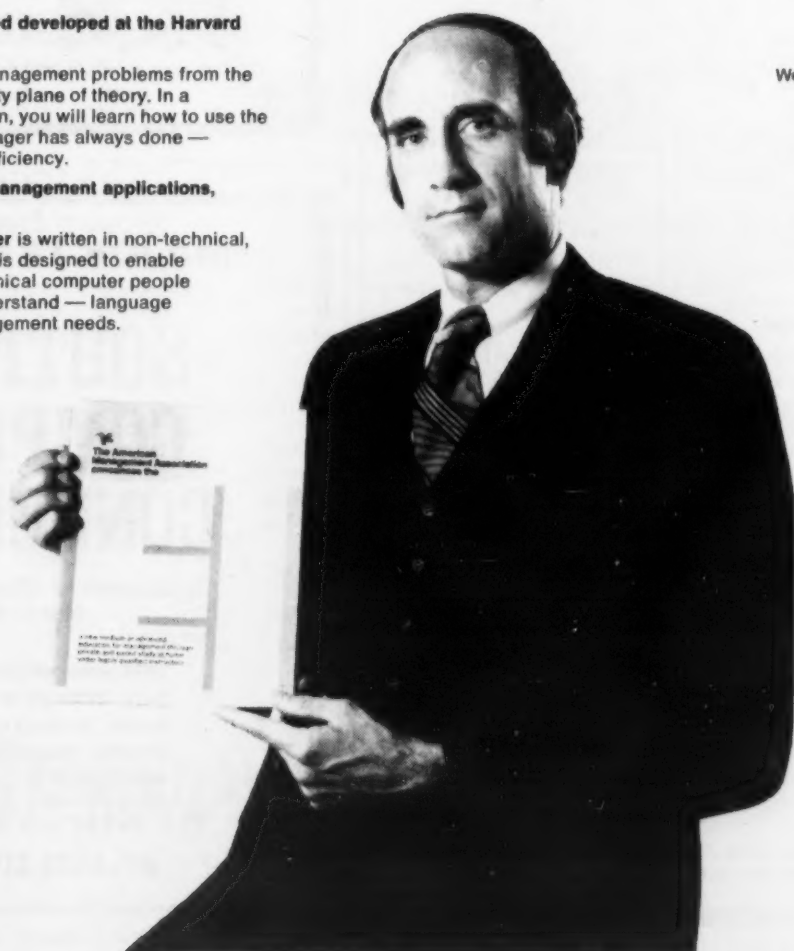
Computerworld is pleased to recommend *Management and the Computer* to its readers as an effective aid in preventing a communications gap between top management and data processing executives.

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	1970-71 RANGE (1)	CLOSE JAN 21 1971	WEEK NET CHNGE	WEEK PCT CHNGE

SOFTWARE & EDP SERVICES

O ADVANCED COMP TECH	1- 6	2	0	0.0
A APPLIED DATA RES.	4- 24	5	+ 1/4	+5.2
O APPLIED LOGIC	1- 18	1 1/2	+ 1/8	+9.0
O ARIES	1- 8	2 1/8	+ 5/8	+41.6
N AUTOMATIC DATA PROC	23- 48	47	- 1/2	-1.0
O AUTO SCIENCES	3- 14	4 3/4	-2	-29.6

O BRANDON APPLIED SYS	1- 10	7/8	0	0.0
O COMPUTER AGE INDUS.	1- 3	1	- 1/8	-11.1
O COMPUTER ENVIRON	1- 15	1	0	0.0
O COMPUTER INDUS.	2- 24	4 1/2	0	0.0
O COMPUTER NETWORK	2- 14	3 1/2	- 1/4	-6.6
O COMPUTER PROPERTY	4- 15	7 3/4	+2	+34.7

N COMPUTER SCIENCES	6- 34	11 1/8	+1 1/2	+15.5
O COMPUTER TASK GROUP	1- 4	1 1/4	0	0.0
O COMPUTER USAGE	2- 8	6 1/2	+1 1/4	+23.8
A COMPUTING & SOFTWARE	16- 75	28 5/8	- 1/8	-0.4
O COMRESS	1- 10	2	- 1/4	-11.1
O COMSHARE	2- 15	5 1/8	- 3/8	-6.8

O CONSOL. ANAL. CENT.	1- 4	1 3/8	+ 1/4	+22.2
O DATA AUTOMATION	1- 24	1 7/8	- 1/8	-6.2
O DATA PACKAGING	5- 29	8	- 3/8	-4.4
O DATAMATION SERVICE	1- 6	2	- 1/8	-5.8
O DATATAB	4- 9	5 3/4	+ 1/4	+4.5
O DIGITEK	1- 5	1 5/8	+ 1/8	+8.3

O EDP RESOURCES	5- 13	7	0	0.0
A ELECT COMP PROG	3- 11	4 1/8	+ 3/8	+10.0
O ELECTRONIC DATA SYS.	31-161	76	+10 5/8	+16.2
O INFORMATICS	4- 21	7	- 1/8	-1.7
A ITEL	6- 26	17 3/8	+ 3/4	+4.5
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O NAT. COMP. SERV.	2- 12	2 3/4	- 1/8	-4.3
N PLANNING RESEARCH	13- 54	18 1/2	+ 3/4	+4.2
O PROGRAMMING METHODS	9- 27	18 1/2	+ 1/2	+2.7

O PROGRAMMING & SYS	2- 5	2 1/4	0	0.0
L PROGRAMMING SCIENCES	1- 33	7/8	0	0.0
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N ELECTRONIC M & M	7- 40	9 3/8	+ 1/4	+2.7

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O FARRINGTON MFG	1- 17	1 7/8	- 1/4	-11.7
O INFORMATION DISPLAYS	4- 20	6 1/8	+ 1/8	+2.0
O KEYDATA CORP	7- 14	12 1/4	-1 3/8	-10.0
O MANAGEMENT ASSIST	1- 4	1	+ 1/8	+14.2
A MARSHALL INDUSTRIES	14- 67	21 1/2	+2 1/2	+13.1

A MILGO ELECTRONICS	15- 42	23 5/8	+ 3/8	+1.6
N MOHAWK DATA SCI	19- 87	25 3/8	- 1/4	-0.9
O OPTICAL SCANNING	11- 52	14 1/2	- 1/4	-1.6
O PHOTON	4- 17	8 1/8	- 3/8	-4.4
O PHOTO-MAGNETIC SYS.	1- 9	3 1/4	+ 1/4	+50.0
A POTTER INSTRUMENT	15- 42	20 3/4	+1 1/2	+7.7

O PRECISION INST.	6- 25	9	+1 1/2	+20.0
O RECOGNITION EQUIP	12- 83	17	0	0.0
O REDCOR CORP.	4- 34	4 5/8	-1 3/8	-22.9
N SANDERS ASSOCIATES	7- 29	15 1/8	+1 5/8	+12.0
O SCAN DATA	5- 53	8 7/8	+ 1/4	+2.8
O TALLY CORP.	10- 23	13 1/4	+ 3/4	+6.0

N TELEX	10- 25	15 3/4	+1 1/4	+8.6
O VIATRON	1- 51	1 3/8	0	0.0

SUPPLIES & ACCESSORIES

N ADAMS-MILLIS CORP	8- 16	15 3/8	+1	+6.9
O BALTIMORE BUS FORMS	6- 21	8	+ 1/4	+3.2
A BARRY WRIGHT	6- 25	8 1/2	- 1/8	-1.4
A DATA DOCUMENTS	15- 35	20 1/4	-1 1/4	-5.8
N ENNIS BUS. FORMS	9- 19	11 5/8	- 1/4	-2.1
O GRAHAM MAGNETICS	4- 13	12 1/2	+1 3/8	+12.3

O GRAPHIC CONTROLS	5- 17	7 1/4	- 1/4	-3.3
N MEMOREX	46-166	57 3/4	+ 3/8	+0.6
N 3M COMPANY	71-114	97	+ 3/4	+0.7
O MOORE BUS. FORMS	25- 39	37 3/4	+ 3/4	+2.0
N NASHUA CORP	21- 43	34 3/4	- 1/4	-0.7
O REYNOLDS & REYNOLD	25- 48	60	+2 1/4	+5.9

E X C H	PRICE			
	1970-71 RANGE (1)	CLOSE JAN 21 1971	WEEK NET CHNGE	WEEK PCT CHNGE

COMPUTER SYSTEMS

O STANDARD REGISTER	17- 30	21 1/2	+1	+4.8
O TAB PRODUCTS CO	4- 12	8 3/8	0	0.0
N UARCO	22- 39	26 3/4	+ 1/2	+1.9
A WABASH MAGNETICS	7- 30	8	+ 3/8	+4.9
O WALLACE BUS FORMS	17- 41	19 3/4	+1 3/4	+29.7

N BURROUGHS CORP	78-173	111	+2 5/8	+2.4
N COLLINS RADIO	9- 37	15 1/8	- 1/2	-3.1
N CONTROL DATA CORP	30-122	52 7/8	+ 1/2	+0.9
O DATA GENERAL CORP	16- 59	20 5/8	+ 1/2	+2.4
N DIGITAL EQUIPMENT	50-124	59 1/2	+5 1/8	+9.4
N ELECTRONIC ASSOC.	3- 11	5 5/8	0	0.0

A ELECTRONIC ENGINEER.	3- 14	5 3/4	+ 1/2	+9.5
N FOXBORO	18- 39	31 7/8	+ 7/8	+2.8
O GENERAL AUTOMATION	9- 42	17	+2	+13.3
N GENERAL ELECTRIC	60-100	100 1/8	+5 5/8	+5.9
N HEWLETT-PACKARD CO	19- 45	32 7/8	+ 1/2	+1.5
N HONEYWELL INC	65-152	86 3/4	-1 1/2	-1.6

N IBM	223-387	315 1/2	+1	+0.3
O INTERDATA INC	3- 22	5 5/8	0	0.0
N NCR	30- 86	38 5/8	-1 1/8	-2.8
N RCA	18- 34	29 3/4	+ 3/4	+2.5
N RAYTHEON CO	16- 33	32 1/2	+3	+10.1
O SCI. CONTROL CORP.	1- 8	3/4	- 1/4	-25.0

N SPERRY RAND	19- 40	26 1/4	+ 1/4	+0.9
A SYSTEMS ENG. LABS	10- 49	15 3/4	+ 7/8	+5.8
N VARIAN ASSOCIATES	9- 29	14 1/2	+1 1/8	+8.4
N WANG LABS.	18- 51	31 7/8	+2 3/4	+9.4
N XEROX CORP	66-115	88	+2 3/8	+2.7

LEASING COMPANIES

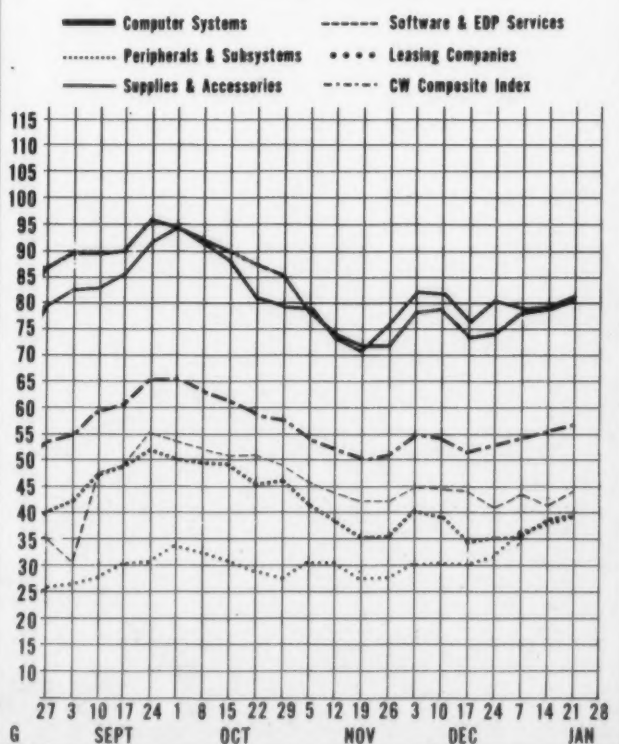
O BOOTHE COMPUTER	8- 25	16 3/4	+1 1/2	+9.8
O BRESNAHAN COMP.	2- 9	4	+ 1/8	+3.2
O COMPUTER EXCHANGE	2- 8	4 1/4	0	0.0
A COMPUTER INVSTRS GRP	4- 12	10 1/8	+ 5/8	+6.5
N DATA PROC. F & G	6- 32	12 7/8	+27/8	+7.2
O DATRONIC RENTAL	2- 8	2 1/2	+ 1/4	+11.1

A DEARBORN COMPUTER	10- 26	25 1/2	+ 1/2	+2.0
O DIEBOLD COMP. LEAS.	2- 8	6 1/8	- 1/8	-2.0
A DPA, INC.	3- 10	5 3/8	+ 1/2	+10.2
A GRANITE MGT	7- 22	9	- 1/8	-1.3
A GREYHOUND COMPUTER	5- 44	8 7/8	- 3/8	-4.0
N LEASCO DATA PROC.	7- 30	17	- 1/8	-0.7

O LECTRO MGT INC	1- 9	1 5/8	- 1/8	-7.1
A LEVIN-TOWNSEND CMP	3- 19	5 1/8	- 1/8	-2.3
O LMC DATA, INC.	1- 4	1 1/8	+ 1/4	+28.5
O NCC INDUSTRIES	3- 8	4 3/4	+ 3/4	+18.7
O SYSTEMS CAPITAL	1- 8	5 3/8	+1	+22.8
N U.S. LEASING	3- 19	18 1/4	+1 7/8	+11.4

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index



Earnings Reports

ADVANCED COMPUTER TECHNIQUES CORP.

Six Months Ended Sept. 30

	1970	1969
Shr Ernd	\$(0.03)	\$0.04
(Loss)		
Revenue	1,539,213	1,683,160
Earnings		
(Loss)	(23,302)	30,799

COMRESS

Nine Months Ended Sept. 30

	1970	1969
Revenue	\$3,594,000	3,661,000
Earnings		
(Loss)	(246,000)	392,000

DATASCAN INC.

Nine Months Ended Sept. 30

	1970	1969
Shr Ernd	\$0.39	\$0.89
Revenue	8,408,887	7,094,571
Earnings	139,213	302,355

DATA GENERAL CORP.

Three Months Ended Dec. 19

	1970	1969
Shr Ernd	\$1.11	\$0.02
Revenue	2,228,000	1,115,000
Tax Cred		44,000
Earnings	220,000	888,000

a-Based on income before tax credit.
b-Equal to five cents a share.

COMPUTER INVESTORS GROUP

Nine Months Ended Dec. 31

	1970	1969
aShr Ernd	\$0.46	\$0.32
Revenue	7,311,258	6,006,160
Spec Cred	b44,000	
Earnings	c966,410	604,711

a-Based on income before special credit; earnings per share calculated assuming the exercise of warrants.
b-Consists of \$179,000 gain on repurchase of convertible debentures, and provision of \$135,000 for estimated loss on investments and advances to an affiliate. c-Equal to 48 cents a share.

MANAGEMENT DATA CORP.

Three Months Ended Nov. 30

	1970	a1969
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COMPUTERWORLD

education

DP Hooks Students, Teachers

BALTIMORE — One-hundred-and-seventy-five Baltimore County high school students have been introduced to a computer and the end result is a lasting and enjoyable friendship.

The students of the seven senior high schools use the computer facilities at the Baltimore County Board of Education to solve math problems in a myriad of fields. Last summer the county school board provided funds for the construction of a computer laboratory and provided a full-time teacher to assist the students.

"And the program has been successful," observed Vincent Barant, coordinator of

the office of mathematics for the school board.

"They're using the computer not only within the province of mathematics, but for projects in fields such as science, art and music."

'Increases Motivation'

Mrs. Mary Alice Vollmer, the computer teacher, is enthusiastic about the value of the program for participating students.

"It greatly increases motivation to have the pupils come here and actually work with the computer. It's much less tedious than solving these problems in the classroom," she said.

Newark Expects to Show Off Individualized CAI Program

NEWARK, N.J. — A computer-assisted instruction program aimed at developing "Individualization of certain phases of instruction," has been approved by the city Board of Education and will go into operation by March 1.

Serving as a showcase project for the northeastern states, the plan will be conducted in cooperation with Science Research Associates of Chicago.

The initial phase of the program will be financed partially by a \$92,500 federal grant under the National Defense Education Act and will be implemented in Clinton Place Junior High School.

The program will require the board to obtain an IBM 360/40 on a five-year lease-purchase plan.

The advantages of the system, according to educational authorities, are that it gives the student individual instruction in

subjects in which he is weak and frees the teacher from rote-type instruction, enabling the teacher to diagnose the problems of the other students.

Initially, each student will be tested by the computer to determine specific tutoring needs and then individual programs will be developed for the students.

The computer will also inform the teacher daily of the progress made by the students and the subjects in which help is needed.

Graphics System Brings Researchers, Computer Together

MADISON, Wis. — The Adage, newest and most revolutionary of the three computing systems at the University of Wisconsin's Computing Center, is making it possible for graduate students and researchers to visually interact with their computer programs.

The Adage is a computer graphics system developed several years ago to help meet a growing need for visual communication between computer and their users. It has been in operation at the university since July 1969.

By employing one of the most basic forms of communication — pictorial representation — The Adage enables a user to display a graph, chart, drawing, or listing of his data on a CRT. With the assistance of a light sensitive pen, the user can rearrange and modify his data while viewing it at close range.

The Adage is connected to another computing system, a Univac 1108, which increases the number and size of computing jobs possible through this graphics system.

The Adage is available to university graduate students and to researchers throughout the state.

Programmer Training Classes Reopened

LOS ANGELES — For those looking for economic indicators signalling an upturn in the economy, a small ray of hope may come from the reopening of programmer training classes at Los Angeles' Urban League Training Center.

The center, which has trained and placed more than 250 disadvantaged persons in EDP jobs over the past two years, had suspended new programmer classes for six months or so during the recent job crunch.

On Jan. 18 a new class of 20 hopefuls began an intensive three-month Cobol programming course with their IBM instructors.

Reason for resumption of classes is that unplaced backlog of programmer graduates is now down to six, from a high of 20 during the worst of the job turndown in late summer.

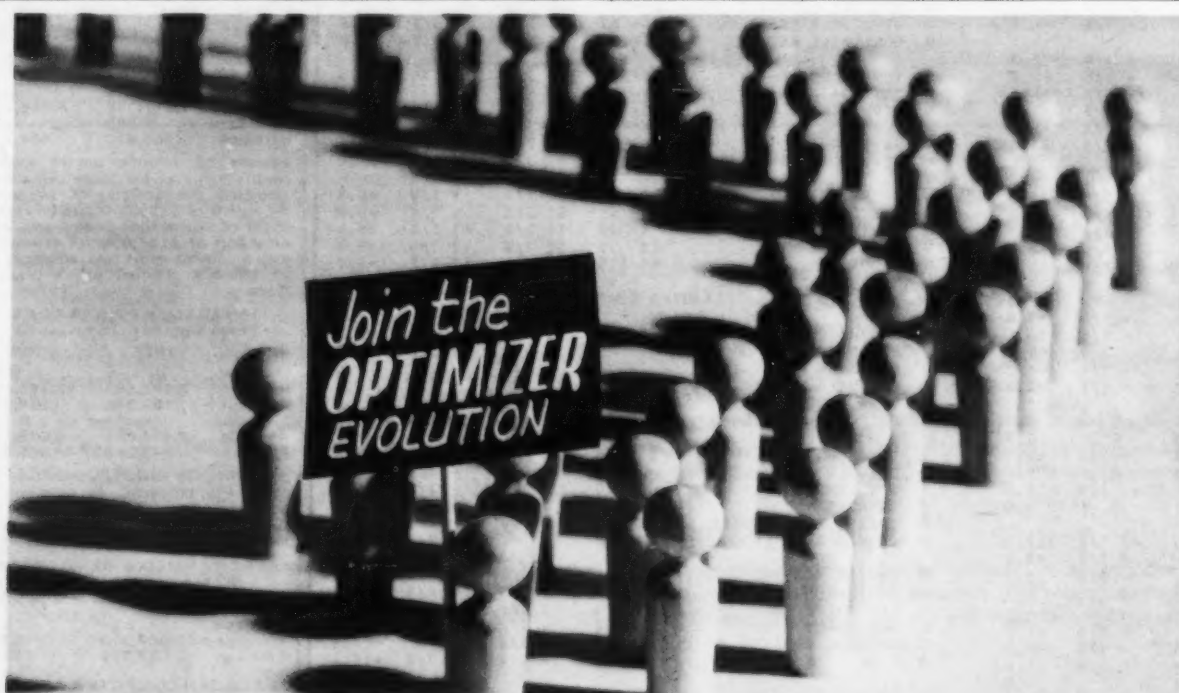
AMA Seminar Canceled

CW Midwest Bureau

CHICAGO — The American Management Association's (AMA) seminar entitled "What the non-EDP manager needs to know about the computer" has been canceled for its January 18 presentation here.

AMA spokesman attributed the seminar's poor attendance, as shown by reservations, as the reason for the cancellation. They said they felt that "the economy and the month of January, historically bad for seminars, were the reasons for the low attendance reservations."

They said they did not feel that lack of interest in EDP by non-EDP management was the cause.



LIBERATE 360 MAIN STORAGE

by automatically reducing the size of OS/360 COBOL programs...
after compilation

The Capex COBOL OPTIMIZER automatically reduces the size of an IBM 360 COBOL object program by reducing main storage space required for procedural coding by 25% to 35%! Considering the space required for data and other uses, the net space savings generally amount to 20% of the total needed by the program.

OPTIMIZED programs run faster — An optimized program uses less CPU time because there are fewer instructions to execute. In addition, the OPTIMIZER's Dynamic Storage Utilization option will automatically redeploy liberated storage at run time to provide extra I/O buffers, and turn on the OS chained scheduling facility.

Easy to use, nothing to change — You run source programs through a compile-and-optimize JCL procedure. That's all. No changes are required in source programs, production JCL, operating procedures, the compiler, OS, or debugging procedures.

The OPTIMIZER and the excellent IBM 360 COBOL compiler work together to produce a compact, highly efficient object module. Join the OPTIMIZER evolution.

OPTIMIZER allows many other throughput enhancements — For certain programs, you may prefer to use the liberated storage to:

- "shoehorn" programs into standard region or partition
- provide more space for SORT
- reduce overlays
- expand working storage
- reduce region/partition size
- cope with growth of the program

Or the Operating System can utilize the liberated main storage:

- for more multiprogramming
- to reduce scheduling bottlenecks
- to increase the number of core contained system modules
- to cope with increasing growth of the system

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